POSITRON EMISSION TOMOGRAPHY CT TO DIFFERENTIATE TUMOR RECURRENCE AND RADIATION-INDUCED PULMONARY FIBROSIS AFTER STEREOTACTIC BODY RADIATION THERAPY


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BACKGROUND-AIM
Changes in lung density on computed tomography CT are common after stereotactic ablative radiotherapy (SABR) and can confound to early detection of recurrence. The aim of this study was to evaluate the role of Contrast Enhanced (CT) and 18F-fluorodeoxiglucose positron emission tomography (FDG-PET/CT) in differentiating tumor recurrence from radiation fibrosis after SABR. Primary tumor maximum standardized uptake value (SUV max) on FDG-PET/CT before and after therapy has been studied as potential prognostic factor for NSCLC patients receiving SABR.

METHODS
24 patients (Mean Age: 70 years; 14 male and 10 female) received SABR for stage I non-small cell lung cancer or metastatic lung cancer. Both FDG-PET/CT and CT were performed before and after treatment in different time point (< 6 months, 6-12 months, 12-24 months). The FDG uptake in the lung region was assessed qualitatively using a 3-point scale (0, none or faint; 1, mild; 2 moderate to intense) ad the shape was evaluated (mass-like or non mass-like). For semi-quantitative analysis, SUV mean and SUV max were calculated and compared them to the pre-therapeutic values.

RESULTS
7 patients had local relapse. In recurrent tumors, the combination of intensity grade 2 and mass-like shape was most common (90%). In contrast, the combination of intensity grade 0 or 1 and no-mass like shape was most common in radiation fibrosis (80%). The SUVmax of tumour relapse after 12 months was higher than of radiation fibrosis (p<0.01) and all tumour recurrence showed the SUVmax > 4 at diagnosis of local failure. At ≥12 months after SABR, the combination of intensity 2 and mass-like FDG uptake or SUVmax ≥ 4 had a high predictive value of local recurrence.

CONCLUSION
The combination of FDG patterns and SUVmax was a useful to discern tumor relapse from radiation fibrosis. CT density changes are common post-SABR and PET scan is more sensitive than CT in detecting recurrences.