SUVmax and Tumour Location in PET-CT Predict Oncogene Status in Lung Cancer

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BACKGROUND
In non-small cell lung cancer, anaplastic lymphoma kinase gene rearrangement (ALK+) and epidermal growth factor receptor mutations (EGFR+) are targetable with tyrosine kinase inhibitors.

PATIENTS AND METHODS
27 patients with ALK+ tumours, who underwent positron emission tomography-computed tomography (PET-CT) prior to any treatment, were identified. 2 equally sized control groups based on consecutive patients with EGFR+ and EGFR/ALK wild-type (wt) were identified. The maximum standardized uptake value (SUVmax), tumour location (central vs. peripheral), as well as patient- and disease-specific characteristics were collected.

RESULTS
Mutation status was significantly associated with SUVmax (p < 0.008). The median SUVmax of the primary tumour in the lung for ALK+ patients (SUVmax 13) was significantly higher compared to that of the EGFR+ (SUVmax 9.8, p = 0.010) and the EGFR/ALKwt group (SUVmax 9.6, p = 0.022). No difference was observed between the EGFR+ and the EGFR/ALKwt group (p = 0.961). Mutation status was also associated with primary tumour location (p = 0.001). There was a significantly lower rate of central tumours in the EGFR+ group when compared to ALK+ tumours (15%, p = 0.002). Among EGFR/ALKwt tumours, 41% were central compared to 63% of ALK+ tumours (p = 0.235).

CONCLUSION
On initial PET-CT, ALK+ primary lung tumours showed a higher SUVmax and were more frequently centrally located while peripheral tumours were more likely to be EGFR+.

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