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MEETING ABSTRACT Open Access

Association between [18F]-fluoro-2-deoxyglucose uptake and expressions of hypoxia-induced factor 1α and glucose transporter 1 in non-small cell lung cancer

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Background/Introduction

High maximal standardized uptake values (SUVmax) on [18F]-fluoro-2-deoxyglucose positron emission tomography (FDG-PET) are associated with inferior survival in non-small cell lung cancer (NSCLC).

Aims/Objectives

Here, we investigated the biological mechanisms underlying FDG uptake in NSCLC.

Method

This study included 133 patients with NSCLC (109 with adenocarcinoma and 24 with squamous cell carcinoma). The patients underwent tumor resection, at the latest, 4 weeks after FDG-PET. The SUVmax values for primary lesions were calculated based on FDG uptake. The expression of hypoxia-inducible factor 1α (HIF1α) and glucose transporter 1 (GLUT1) was evaluated on immunostained tumor sections using six-point grading scales.

Results

SUVmax and the expression of HIF1α and GLUT1 were significantly higher in squamous cell carcinoma than in adenocarcinoma ($p < 0.001$, $p = 0.034$, and $p < 0.001$, respectively). In adenocarcinoma, but not squamous cell carcinoma, SUVmax, HIF1α, and GLUT1 correlated with various clinicopathological factors relating to malignancy, and SUVmax and GLUT1 were associated with disease-free survival (DFS) ($p < 0.001$ and $p = 0.029$) and overall survival (OS) ($p < 0.001$ and $p = 0.033$, respectively). Moreover in adenocarcinoma, HIF1α and GLUT1, GLUT1 and SUVmax, and HIF1α and SUVmax were significantly correlated ($p < 0.001$ for all), suggesting that HIF1α-induced GLUT1 might influence SUVmax values on FDG-PET.

Discussion/Conclusion

In lung adenocarcinoma, but not squamous cell carcinoma, HIF1α, and GLUT1 expressions indicate tumor aggressiveness pathologically, and might explain high FDG uptake on PET and correlate with poor prognosis.

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