

Blood-based detection of lung cancer using cysteine-rich angiogenic inducer 61 (CYR61) as a circulating protein biomarker

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Background & objectives

Lung cancer is the most often diagnosed cancer and the main cause of cancer deaths in the world compared to other tumor entities. To date, the only screening method for high-risk lung cancer patients is low-dosed computed tomography which still suffers from high false positive rates and overdiagnosis. We aimed to improve the diagnosis of lung cancer by detection of the protein Cysteine-rich angiogenic inducer 61 (CYR61) in human plasma.

Methods

CYR61 was determined in plasma using an enzyme-linked immunosorbent assay. Plasma samples of patients with lung cancer (n=87) including adenocarcinomas (n=49), small cell carcinoma (n=10), squamous cell carcinoma (n=22), and others (n=6) as well as gender and age-matched healthy controls (n=150) were analysed. We calculated the sensitivity and specificity of CYR61 for discrimination of the compared study groups using receiver operating characteristics (ROC) curve analyses.

Results

CYR61 concentrations in plasma were significantly elevated in 87 lung cancer patients (13.7 ± 18.6 ng/ml) compared with 150 healthy controls (0.29 ± 0.22 ng/ml). Subset analysis stratified by sex revealed increased CYR61 concentrations for adenocarcinoma and squamous cell carcinoma in men compared to women. For male lung cancer patients versus male healthy controls, the sensitivity was 84% at a specificity of 100%, whereas for females the sensitivity was 27% at a specificity of 99%.

Conclusion

The determination of circulating CYR61 protein in plasma might improve the detection of lung cancer in men. The findings of this pilot study support further verification of CYR61 as a biomarker for lung cancer detection in men. Additionally, CYR61 is significantly elevated in women but sensitivity and specificity for CYR61 are too low for the improvement of the detection of lung cancer in women.