

Oral presentation

EGFR-gene analysis on cytological specimens of non-small-cell lung cancers

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Aims

The diagnosis of lung cancer is often based on cytology alone. The relative paucity of tumor cells in these specimens is a challenge for the analysis of epidermal growth factor receptor (EGFR) gene mutation and EGFR gene copy number to select for treatment with EGFR-tyrosine kinase inhibitors. Here, we tested whether such EGFR gene analyses are feasible on cytological specimens of non-small-cell lung cancers (NSCLC).

Methods

We analyzed 87 Papanicolaou stained cytological specimens from patients with NSCLCs (51 adenocarcinomas, 27 not further defined NSCLCs, 8 squamous cell carcinomas and one neuro-endocrine carcinoma). The carcinoma cells were selectively dissected from the cytological specimens under visual control using laser microdissection in combination with a laser pressure catapulting system (PALM®). We sequenced the exons 18–21 of the EGFR gene. EGFR gene copy number was evaluated by fluorescence in situ hybridization (FISH) under visual control using relocation software. A FISH positive result was defined according to the criteria defined by F. Cappuzzo *et al.* on biopsies of NSCLCs [1]. FISH results of cytological specimens were compared with the FISH results on corresponding biopsies.

Results

DNA sequencing was successful in 79 of the 87 specimens (91%). Three adenocarcinomas showed EGFR-gene mutations (3.8%). 44 of 65 cancers (68%) were FISH positive on the cytological specimens as compared with only 2 of 9 biopsies (24%).

Conclusion

EGFR gene sequencing and FISH are well applicable to cytological specimens from lung cancers in diagnostic routine using laser microdissection and automated relocation. The high FISH positive rate of 68% suggests that the criteria for a FISH positive result suggested by Cappuzzo *et al.* need to be adjusted for cytological specimens.

References

1. Cappuzzo F, Hirsch FR, Rossi E, Bartolini S, Ceresoli GL, Bemis L, Haney J, Witta S, Danenberg K, Domenichini I, *et al.*: **Epidermal growth factor receptor gene and protein and gefitinib sensitivity in non-small-cell lung cancer.** *J Natl Cancer Inst* 2005, **97**:643-655.