Title: Diagnosis of pathological changes in bronchial tree using focal fluorescence spectroscopy

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Body: Background: Early diagnosis of recurrence of central lung cancer is a major problem in oncology. Objectives: Evaluate possibilities of employing Focal Fluorescence Spectroscopy (FFS) method in a diagnosis of pathological changes in bronchial tree. Methods: The study includes the follow-up results of 68 patients with non-small cell lung cancer who have received a combination therapy. During the follow-up period there has been provided a traditional bronchoscopy, which was supplemented by FFS of bronchial mucosa with a measurement of autofluorescence (AF). AF spectra were measured in the mucosa of a bronchus resection stump and intact bronchus in the symmetrical site of the contralateral lung. There has been analyzed two spectral features: the intensity at the maximum range of the AF and magnitude of spectral fluorescence diagnostic parameter $D_f$. After measuring the AF, there has been taken biopsy specimens of bronchial mucosa for a morphological study. Results: Laser-excited autofluorescence in the green region of the spectrum of normal bronchial epithelium intensely fluoresces with a maximum wavelength near 580 nm. In the case of an acute inflammation of mucosa there has been a significant decline of the maximum intensity and increase in the parameter $D_f$. In the areas of malignancy, there has been a rapid decline (up to 10-fold) of the autofluorescence intensity along with rising of the spectral diagnostic parameter $D_f$. Conclusions: Analysis of the spectra of laser-induced autofluorescence and an estimate of the spectral diagnostic parameter $D_f$ has revealed significant differences in the spectra of normal bronchial epithelium versus acute inflammation or malignant lesions.