

Abstract

The aim of this work has been the development and optimization of methods for early diagnosis of lung cancer, their utility and integration into daily practice.

Firstly, we developed a device for measurement of endobronchial temperature (thermbronchoscopy) and found significant difference in endoluminal temperature above tumors and infiltrated lymph nodes compared to healthy regions. We further designed an appliance for near infrared spectroscopy of the bronchial mucosa and identified spectroscopic features useful for localization of solitary pulmonary nodule. The use of the appliance improved yield of endobronchial biopsy compared to endobronchial ultrasound. In the next part of the study, we describe further techniques for early diagnosis of lung cancer including endobronchial ultrasound, optical coherence tomography, confocal fluorescence microendoscopy, reflectance spectroscopy, autofluorescence bronchoscopy, fluorescence bronchoscopy, and narrow band imaging with concise introduction of our experience gained in several pilot projects. Next, we showed the utility of measurement of acetic acid in exhaled air as a promising biomarker for non-invasive identification of patients with symptomatic acid gastroesophageal reflux. Lastly, we demonstrated significant difference in radiation dose in HRCT of the lung among three CT scanners in a single institution.