Virtual fly-through bronchoscopy yields real results

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For patients with non-small cell lung cancer (NSCLC) the accurate determination of the lymph node status before therapy is critical to develop an individualized treatment plan. Research from the October issue of the *Journal of Nuclear Medicine* highlights a new way for this information to be collected -- a virtual fly-through three-dimensional 18F-FDG PET/computed tomography (FDG-PET/CT) bronchoscopy that has high diagnostic accuracy for the detection of regional lymph node metastases.

According to Till A. Heusner, MD, senior author of the study "Diagnostic Accuracy of Virtual 18F-FDG PET/CT Bronchoscopy for the Detection of Lymph Node Metastases in Non-Small Cell Lung Cancer Patients," this is one of the first studies dealing with a virtual bronchoscopy program that integrates functional information and anatomical data.

To determine the effectiveness of the virtual bronchoscopy, researchers performed whole-body 18F-FDG PET/CT scans on 61 consecutive NSCLC patients. From the data collected, virtual 18F-FDG PET/CT bronchoscopies were reconstructed and diagnostic accuracy of detection of regional lymph node metastases was evaluated using the 18F-FDG PET/CT scans as a standard of reference. Researchers conducted their evaluation by measuring the mean duration time from the start of the virtual bronchoscopy until the images were displayed, maximum standardized uptake value (glucose metabolic activity) (SUVmax), SUVmean, short-axis diameter and the distance of the airways of the

regional [lymph nodes](#).

Results from the virtual fly-through bronchoscopy showed that the diagnostic accuracy for the detection of lymph node metastases was 81 percent. The mean duration from the start of the virtual 18F-FDG PET/CT bronchoscopy tool until image display was 22 seconds, and the mean smallest diameter of accessible bronchi was 3 mm. The differences in the SUVmax, SUVmean, short-axis diameter and distance to the airways among both true and false positive and true and false negative lymph nodes also were statistically significant. As such, the authors concluded that virtual 18F-FDG PET/CT bronchoscopy enables non-invasive fly-through -- even in relatively small airways in the periphery of the lung -- with high diagnostic accuracy.

According to Heusner, as a complement to PET/CT imaging the software may be used in the future to virtually visualize the bronchial system before interventional procedures, to plan optical bronchoscopies and define regions where a bronchoscopy-guided biopsy may be most promising for sampling of malignant tissue.

He added, "With the virtual fly-through three-dimensional 18F-FDG PET/CT bronchoscopy, nuclear medicine physicians may be able to present images that better meet the needs of the referring clinicians, as the tool simulates the bronchoscopic view a pulmonologist is accustomed to. This technique may also improve the process of acquiring tissue samples for characterization with emerging molecular diagnostics that can guide application of new targeted therapies in [lung cancer](#)."

Lung and bronchus cancers represent the cancer types with the most cancer-related deaths in the United States, both in female and in male patients. It was the most common newly diagnosed cancer type in the United States in 2010, with more than 220,000 patients diagnosed. NSCLC accounts for approximately 80 percent of all lung cancer

disease.

Provided by Society of Nuclear Medicine

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