RESEARCH UPDATE

Diagnostic Yield of Digital Tomosynthesis-Assisted Navigational Bronchoscopy for Indeterminate Lung Nodules

Electromagnetic navigational bronchoscopy (ENB) is an emerging technology that improves the diagnostic yield of bronchoscopy for the assessment of peripheral pulmonary nodules. The diagnostic yield of ENB ranges from 59% to 74%, independent of lesion size and lobar distribution.

Electromagnetic navigation bronchoscopy (ENB) is intended to enhance standard bronchoscopy by providing a three-dimensional roadmap of the lungs and real-time information about the position of the steerable probe during bronchoscopy. The purpose of ENB is to allow navigation to distal regions of the lungs so that suspicious lesions can undergo biopsy and to allow for placement of fiducial markers

James Katsis, MD, recently joined Rush University Medical Center as an assistant professor after completing his training at Vanderbilt University Medical Center in the emerging field of interventional pulmonology. There he published multiple papers looking at bronchoscopic techniques to improve the accuracy and safety of minimally invasive biopsies on the lungs. He continues to actively research in hopes of advancing the field of interventional pulmonology and lung cancer care.

Katsis has published the largest case series of navigational bronchoscopy with electromagnetic navigation bronchoscopy (ENB) as the principal investigator while at Vanderbilt University and has brought his education and experience here to his patients and colleagues.

His most recent study tested the addition of digital tomosynthesis to electromagnetic navigation, using intraprocedural images obtained from a C-arm fluoroscope to identify target lesion location and update navigational guidance which may improve diagnostic yield.

Results

This study occurred over a one-year period with a total of 324 patients with consecutive bronchoscopies using tomosynthesis-assisted fluoroscopic electromagnetic navigational bronchoscopy (F-ENB). The primary outcome was diagnostic yield (rate of technically successful biopsies leading to a definitive diagnosis).

In this case, a bronchoscopy was defined as diagnostic if pathologic examination revealed malignancy or specific histological findings indicative of lesional sampling with confirmatory six-month follow-up for benign lesions.

In this case series, a total of 324 patients with 363 nodules underwent F-ENB. Of the 363 nodules, 299 (82.4%) had lesional findings. At six-month follow up, among these 299 nodules, six were found to be false negatives and 12 nodules were lost to follow up. Considering all nodules lost to follow-up as false negatives, the six-month diagnostic yield was 77.4%.

This study concludes that the diagnostic yield of F-ENB may exceed that of traditional ENB. It also exceeds the baseline percentage of traditional ENB. The findings reflect that technology improves diagnostic yield with earlier diagnosis and better outcomes for people with early stage lung cancer.

Phase 2

Phase 2 of this study plans to start enrolling soon at Rush. Veritas, NIH is a prospective randomized control trial comparing the diagnostic yield and safety of navigational bronchoscopy compared to transthoracic needle aspiration for solitary pulmonary nodules.

Ideal patients are those who have indeterminate lung nodules, meaning they have a spot on their CT scan that could be cancerous and the scan alone cannot determine this.

To learn more or refer a patient, please call (312) 942-6744 or visit www.rush.edu/services/interventional-pulmonology-services.

More About Interventional Pulmonology

Pulmonary nodules are identified on plain chest radiographs or chest computed tomography (CT) scans. Although most of these nodules are benign, some are cancerous, and early diagnosis of lung cancer is desirable because of the poor prognosis when cancer is diagnosed later in the disease course. The method used to diagnosis lung cancer depends on a number of factors, including lesion size and location, as well as the clinical history and status of the patient. There is generally greater diagnostic success with centrally located and larger lesions.

A navigational bronchoscopy uses a special bronchoscope to examine and treat lesions in areas of the lungs that are inaccessible using a regular bronchoscope. Navigational bronchoscopy combines electromagnetic navigation with real-time computed tomography (CT) images to create a three-dimensional map of the lungs. Doctors are then able to use this map to guide the navigational bronchoscope, which includes an extended working channel and guide wire, to difficult-to-access areas of the lungs to take a biopsy or help guide radiation therapy directly to a hard-to-reach lesion.