

PET outperforms CT in characterization of lung nodules

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Researchers involved in a large, multi-institutional study comparing the accuracy of positron emission tomography (PET) and computed tomography (CT) in the characterization of lung nodules found that PET was far more reliable in detecting whether or not a nodule was malignant.

“CT and PET have been widely used to characterize solitary pulmonary nodules (SPNs) as benign or malignant,” said James W. Fletcher, professor of radiology at Indiana University School of Medicine in Indianapolis, Ind. “Almost all previous studies examining the accuracy of CT for characterizing lung nodules, however, were performed more than 15 years ago with outdated technology and methods, and previous PET studies were limited by small sample sizes,” he noted.

“Detecting and characterizing SPNs is important because malignant nodules represent a potentially curable form of lung cancer. Identifying which SPNs are most likely to be malignant enables physicians to initiate the proper therapy before local or distant metastases develop,” said Fletcher.

In a head-to-head study addressing the limitations of previous studies, PET and CT images on 344 patients were independently interpreted by a panel of experts in each imaging modality, and their determination of benign and malignant nodules were compared to pathologic findings or changes in SPN size over the next two years.

The researchers found that when PET and CT results were interpreted as “probably” or “definitely” benign, the results were “strongly associated with a benign final diagnosis”—in other words, the modalities were equally good at making this determination. PET’s superior specificity (accuracy in characterizing a nodule as benign or malignant), however, resulted in correctly classifying 58 percent of the benign nodules that had been incorrectly classified as malignant on CT. Furthermore, when PET interpreted SPNs as definitely malignant, a malignant final diagnosis was 10 times more likely than a benign.

SPNs are commonly encountered in both primary and specialty settings, often showing up on chest X-rays obtained for some other purpose than cancer screening and are often the first manifestation of lung cancer. The question for these patients then becomes whether to undergo surgery, undergo a needle biopsy or “watch and wait” to find out if the nodule is benign or malignant but treatable.

“In patients with an untreated and undiagnosed SPN between 7 and 30 millimeters, PET provides better identification of malignant nodules that require a more aggressive treatment approach,” said Fletcher. “PET in combination with CT can also provide good identification of those nodules that are most likely to be benign, suggesting that a ‘watch and wait’ strategy can be adopted in lieu of unnecessary invasive—and expensive—procedures such as needle biopsy or surgery,” he added.

According to the American Cancer Society, lung cancer is the leading cause of cancer deaths in both men and women in the United States, with approximately 155,000 deaths each year. Although the survival rate is 49 percent for cases detected when the disease is still localized, only 16 percent of lung cancer cases are diagnosed at this early stage. Recently, almost 7 percent of 1,000 healthy volunteers in New York who participated in the Early Lung Cancer Action Project were found to have between one and three nodules on baseline screening X-rays.

Source: Society of Nuclear Medicine

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