Follow-up and Management of Indeterminate Lung Nodules Detected Incidentally on Nonscreening CT

Purpose

To increase awareness of the medical evidence for follow-up testing, improve communication between rendering and ordering physicians, reduce unnecessary patient radiation exposure, improve the cost effectiveness of lung nodule evaluation, and increase primary care physician comfort with managing this evaluation while maintaining a high level of sensitivity in early diagnosis of the few lung cancers that are found among this cohort of patients.

Overview

Small pulmonary nodules are common incidental findings on chest and abdominal CT scans. Lung cancer screening CT trials have demonstrated that up to 51% of smokers, over 50 years of age, will have one or more such nodules, the vast majority of which are benign. The risk of malignancy as a cause of any such nodule in these high risk populations is best correlated with nodule size such that the likelihood of malignancy is 0.2% for nodules <3 mm, 0.9% for nodules 4-7 mm and 18% for 8-20 mm nodules. The original Fleischner Guidelines were not based on nodule type, only size and risk. (1) However, more recently, it has been demonstrated that solid and subsolid nodules behave differently and require different follow-up protocols. (2) As reported by Henschke et al in a study of 233 instances of positive findings at baseline low-dose CT screening examinations, among 44 (19%) resected subsolid lesions, malignancy was diagnosed in 15 (34%). The malignancy rate for solid nodules was 7% ($P < .001$). Importantly, the malignancy rate for part-solid ground glass nodules (GGNs) was 63%, compared with 18% for pure GGNs. Even after adjusting for size, the malignancy rate for part-solid GGNs again proved significantly higher than that for either solid or pure GGNs ($P = .03$). Similar to solid lesions, large pure GGNs are more likely to be invasive. (2)

Past recommendations, based largely on pre-CT era follow-up of lung nodules seen on chest radiograph (CXR), called for a large number of follow-up studies to be performed resulting in additional radiation exposure, and have not clearly demonstrated improvements in long term health outcomes nor to be cost-effective. (1) Although widely recognized, the Fleischner Guidelines have not been universally implemented and recent studies have sited good awareness but inconsistent conformance to the guidelines. (3) Consequently, an advisory committee was formed in 2011 by the Quality Collaborative to develop Community-wide guidelines and was reconvened in 2014 to address new science in the management of subsolid nodules. The advisory committee included members from the physician community, area hospitals and health plans. The physician representation included internists, pulmonologists, and diagnostic and thoracic radiologists. Additional input from the community was instrumental in the review and development process of these guidelines.

As a result, the Monroe County Medical Society through its Quality Collaborative has chosen to adopt the updated Fleischner Society Guideline recommendations for follow up and management of incidentally found lung nodules. (2) These guidelines are based on a greatly improved understanding of the natural history of solid and subsolid (Pure Ground Glass and Part-Solid) lung nodules gleaned from CT based lung cancer screening trials performed over the last decade. This data suggests that solid nodule follow up intervals and duration can be individualized based on patient risk factors for lung cancer, nodule size and nodule characteristics. The follow up intervals for subsolid nodules is based solely on nodule size with longer time intervals for a longer duration.

The two recommendations below were developed to help physicians implement the Community Guidelines through a standardized process. Pay close attention to the two entirely separate sections, one addressing the management of solid and the other subsolid nodules. Please note that these recommendations include those specific for the radiologist such as CT technique, nodule characterization and impression reporting as well as topics more germane to the clinician such as interval follow up recommendations, lung cancer risk stratification, and cautionary notes.