The Diagnostic Strategy for Lung Cancer

Has Determining Malignancy or Benignity Become More Accurate?

In 1998, approximately 150,000 Americans were diagnosed with lung cancer. In many of these patients, the cancer presented as a solitary pulmonary nodule (SPN). The generally accepted radiologic definition of an SPN is a rounded opacity in the lung with a diameter of < 3 cm. Spicular irregular masses, large masses, or ill-defined masses are not technically “nodules,” although many of the principles described for the management of the SPN may still apply.

Each year, tens of thousands of patients who present with SPNs will, after an extensive evaluation, turn out to have nonmalignant lesions. During the past 2 decades, imaging by chest CT has played a major role in the evaluation of SPNs and is particularly important in determining the presence or pattern of calcification. For nodules with patterns of calcification that are radiologically “indeterminate” and for noncalcified lesions, the differentiation between the malignant and benign usually requires a more invasive approach, resulting in high financial costs as well as in discomfort and risk to the patient.

The various imaging modalities with promise for discrimination between benign and malignant SPNs currently include the quantitation of IV contrast enhancement using CT,2,3 gadolinium-enhanced MRI,4 and positron emission tomography (PET).5

In this issue of CHEST (see page 1232), Blum and colleagues describe their experience in a multicenter phase III study with the use of a new diagnostic agent, 99mTc depreotide. This novel peptide-based agent has received US Food and Drug Administration approval for use in the imaging of suspected malignant tumors in the lung. Following IV injection, this agent produces high-contrast resolution single photon emission CT (SPECT) images with little pulmonary uptake. The encouraging results of an earlier phase II study using this agent led to a larger prospective study involving 114 patients > 30 years of age with SPNs < 6 cm in diameter. Nodules shown to have benign patterns of calcification on chest CT scans or radiographic nodule stability for > 2 years were not included in this study. The mean age of the study group was 64 years, with nearly an even distribution of men and women. The authors report that 99mTc depreotide scintigraphy correctly identified 85 of 88 histologically proven malignant lesions. The lung nodule size ranged from 0.8 to 6 cm. The authors concluded that this method had 96.6% sensitivity and 73.1% specificity. The three false-negative scans were in nodules that were < 2 cm in size. Six of seven false-positive scans were granulomatous lesions. The false-positive and false-negative results compare favorably with the results reported in a recent fluorine-18 deoxyglucose PET evaluation of SPNs.7

How will the results of the study of Blum et al affect the current management strategies for patients with SPNs? Obviously, the challenge for the clinician is to establish whether the nodule is benign or malignant. Most experienced clinicians approach the management of SPNs by roughly estimating the probability of cancer (PCA) using multiple variables such as the age of the patient, their smoking history, the size and location of the nodule, the nature of the nodule’s edge as determined by CT, and the doubling time (if known). Previous studies have suggested that the PCA can be calculated by using a Bayesian approach.8,9 More recently, Swensen and colleagues,10 using a multivariate model to estimate the likelihood that a nodule is malignant, found their model to be no better in predicting SPN malignancy than experienced physicians.

In general, immediate thoracotomy is the usual course when the PCA is high (> 60%), and the watch-and-wait strategy is acceptable when the PCA is low (< 20%).11 Somewhere during the evaluation, a decision on whether to perform fine-needle aspiration, video-assisted thoracoscopy, or bronchoscopy using various methods of biopsy (transbronchial or Wang, for example) is usually made. Clearly, other important considerations in the decision process should include risk-to-benefit calculations, patient preference, local expertise, and cost-effectiveness.

It is now likely that 99mTc depreotide SPECT scintigraphy will be included routinely as one of the

CHEST / 117 / 5 / MAY, 2000

1219
results of 99mTc depreotide SPECT scintigraphy will more clinical data and experience, it is likely that the effective practice. Although it is important to acquire to aid in this task will become truly critical to future data and additional clinical experience will give the answer to these questions.

It is exciting to see applications of molecular biology moving into daily clinical practice. The need for a noninvasive means in determining malignancy or benignity of SPNs has become increasingly important. The ability of 99mTc depreotide scintigraphy to aid in this task will become truly critical to effective practice. Although it is important to acquire more clinical data and experience, it is likely that the results of 99mTc depreotide SPECT scintigraphy will now be quickly incorporated into our daily calculation of the PCA for all lung nodules.

Samuel V. Spagnolo, MD, FCCP
Washington, DC

Coronary Artery Bypass Grafting in the Elderly
The Challenge and the Opportunity

Nowadays, people, especially women in industrialized societies, can aspire to a life expectancy such as the Biblical “three score years and ten” (70 years) and beyond. As a result of this lengthening in life expectancy, coronary artery bypass grafting (CABG) has become an increasingly common operation in the elderly population. Similar to previous reports from Europe and North America, in this issue of CHEST (see page 1262) Hirose and colleagues retrospectively compared CABG in young patients vs elderly patients (ie, people > 75 years of age) over an 8-year period from a single institution in Japan, a country with one of the longest life expectancies. The authors showed that the mortality and morbidity for CABG were both higher in the elderly group. However, they also observed that it was the coexisting morbidity (eg, cardiac or renal failure) rather than the advanced age per se that was responsible for early and late deaths. There was no difference in the cardiac event-free survival rates between the two groups.

These findings seem to be consistent with those in reports from Western societies, with the exception that in Japan the average postoperative hospital stay (18 days for the young and 21 days for the elderly) is much longer than in most medical centers in the United States. This reflects differences in the expectations of patients and, more so, in the health-care delivery systems (ie, the predominantly managed care in the United States vs a highly centralized, government-funded [taxpayer-supported] health-care program in Japan). A detailed discussion of the different health plans is beyond the scope of this editorial. Nevertheless, it is important to emphasize that the length of hospital stay is often not viewed by health-care administrators as an important index on the quality of health care outside the United States—at least not yet.

References