

EDITORIAL

A Decision Analysis Approach to the Treatment of the Patient with Suspected Pulmonary Emboli and an Intermediate Probability Lung Scan

I agree with Dr. Quinn's initial statement, "there remains no clear consensus as to the appropriate further investigation and management of the patient suspected of pulmonary emboli who has an intermediate lung scan."

Dr. Quinn's proposed algorithm assumes that patients referred for lung scanning are being seriously pursued for pulmonary embolism and that their interpretations will always be interpreted and managed by clinicians in that light. Some patients, however, are referred for the evaluation of fever, unexplained hypoxemia, arrhythmias, chest radiograph abnormalities or vague chest complaints. During the PIOPED study, we found that our clinicians had a wide range of indicators for laboratory or angiographic studies, indicators that were often independent of the lung scan interpretation. This variation in clinical indications extends to the patients referred for lung scans: some clinics find normal scans in 30%–40% of their patients, while others find normals in less than 5%.

Dr. Quinn's arguments also assume that the abnormalities present on lung scans are most often the result of pulmonary emboli; but these abnormalities may also result from airway and airspace lung disease, as well as from neoplasms, scarring, and extraparenchymal thoracic pathology. Unfortunately, clinicians are often confused about the meaning and value of the

lung scan report. Initially, interpretations of lung scans were either positive or normal. With time and experience, however, these options have expanded to normal, low-low, low, indeterminate, intermediate and high probabilities. The complexity is understandable, but the results are less so. Some clinicians, confronted with a chest film with any abnormality, believe that a lung scan will be useless and therefore only refer these patients for pulmonary arteriography. Others treat patients on the basis of low probability interpretations, especially if they think that there is a strong clinical presentation for pulmonary emboli.

An additional complicating factor is the widely held myth that the lung scan, as well as the pulmonary arteriogram, have a value similar to that of clinical laboratory results. We need to educate our colleagues to the fact that lung scan interpretation is subject to the same inter- and intra-observer variability as other radiologic studies. The interpretation of lung scans and the accurate communication of the results is a difficult and complex art.

Unfortunately Dr. Quinn's projections incorporate data obtained from outdated medical literature. The means used to establish a diagnosis and manage patients when these data were current would not be acceptable today. The factors associated with the risk of recurrent or fatal embolism reported 40 years ago, are not likely to be the same factors present in the contemporary medical environment.

The PIOPED study discovered that in the 20% of patients with low probability lung scans who had clinical presentations strongly suggesting pul-

monary embolism there was a 40% incidence of pulmonary embolism. Indeed, if one were to assume that patients in whom good clinical presentations for pulmonary emboli were consistently present and were always referred with the intention of aggressively pursuing the question of pulmonary embolism, then patients with indeterminate, intermediate and low lung scan interpretations should be referred for pulmonary arteriography. If we include those patients where anticoagulation is either a contraindication or a serious risk, the total patient population referred for angiography would approach that of lung scans. I encourage the liberal use of pulmonary arteriography, but this would represent an untenable, excessive overutilization of the procedure.

Clearly, there needs to be improvement in the materials, techniques and interpretative skills utilized in lung scans. The lung scan is imperfect, but until we have a better method improvements in the integration and communication of the scan interpretation can result in better patient management. I would second Dr. Quinn's encouragement, when appropriate, of the wider use of pulmonary arteriography, since its morbidity and mortality are lower than is generally believed. The basis for referral, however, should not just lie with the lung scan interpretation. To accomplish a more appropriate and cost-effective use of expensive and limited medical resources, we need to include the clinical presentation as well.

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