Chest Ultrasonography as a Replacement for Chest Radiography in the ED

To the Editor:

The study by Zanobetti et al 1 in a recent issue of CHEST (May 2011) proposes chest ultrasonography as a replacement for chest radiography as the initial imaging modality in the ED. Although the superior sensitivity of ultrasonography over chest radiography for assessment of effusion is acknowledged and in keeping with previous studies,2 there are a number of caveats to using ultrasonography in favor of chest radiography as a first-line imaging test.

First, the training required for detecting the sonographic features of pneumothorax, localized atelectasis, and pulmonary fibrosis is extensive, and probably requires at least level 2 Royal College of Radiology training in chest ultrasonography in the United Kingdom (if not level 3, which would be equivalent to a radiologist).3 In addition, acquisition and interpretation of sonographic images is notoriously operator dependent, unlike interpretation of chest radiographs or CT images. This also presents issues with how a critical mass of operators who are adequately trained can be generated for the ED environment.

Second, acquisition of ultrasound equipment has cost implications for financially rationed health-care systems. This usually requires the demonstration of cost utility, which may be demonstrable for effusions4 but not the other conditions encountered in the study, on the basis of its performance against chest radiography.

Third, in the detection of pneumothorax, the chest radiograph (unlike ultrasonography) provides useful ancillary information as to the anatomic extent and location of most pneumothoraces (unless too small to be visible, in which case CT scan is needed). Many guidelines use the chest radiograph appearance in pneumothorax to guide further management.5

Finally, the chest radiograph may also give useful ancillary information not available from the ultrasonograph (eg, a more central lung neoplasm, mediastinal adenopathy, or a dilated right interlobar pulmonary artery suggesting pulmonary hypertension). In summary, chest ultrasonography has many applications, especially in the assessment of pleural effusion, but it should not replace the chest radiograph as a first-line imaging test in the assessment of acutely dyspneic patients presenting to the ED.

Andrew R. L. Medford, MBChB, MD, FCCP
Bristol, England

Affiliations: From the North Bristol Lung Centre, Southmead Hospital.
To the Editor:

We thank Dr Medford for his thoughtful comments on our article regarding the use of chest ultrasonography (CUS) in the ED.1 In his letter, Dr Medford expressed some concerns for the use of CUS before chest radiography as a first-line imaging test. In general, we would agree with Dr Medford’s concerns if we had proposed the use of CUS in general clinical practice, but we limited the use of this diagnostic tool as a first-line screening modality in the ED. As a consequence, we never proposed the replacement of chest radiography with CUS in the clinical management of all chest/lung diseases. Instead, we presented data supporting the advantages of ultrasonography (eg, less time consuming, absence of ionizing radiations) in the initial evaluation of patients presenting in the ED with acute dyspnea.

Due to this limited and focused use of CUS, the training required to achieve clinical competence is probably shorter than the training suggested by Dr Medford. In effect, the American College of Emergency Physicians’ Emergency Ultrasound Guidelines propose a 1-day introductory course and a minimum 2-week rotation; a minimum of 150 ultrasound examinations must be performed to acquire a sufficient level of competency. This training duration seems to be significantly shorter than the training duration proposed by the Royal College of Radiology.

If, as suggested by the American College of Emergency Physicians, emergency ultrasonography education is incorporated into the core educational program for all emergency medicine residency programs, in a few years all new emergency physicians will have the required competency, and a critical mass of operators will be available in the ED. Obviously, as for all novel developments, a delay is inevitable before a widespread diffusion of the new methodology is realized.

Regarding the costs associated with the use of ultrasonography in the ED, at least in our experience, almost all EDs had ultrasound equipment. However, as suggested by Dr Medford, future studies must be performed to demonstrate the cost-effectiveness of CUS vs chest radiography. Regarding the detection of pneumothorax, several data demonstrated that small pneumothorax can be missed by bedside radiography but detected by CUS and subsequently confirmed by chest CT scan.2-4 In conclusion, we never stated that chest radiography can be eliminated from the workload of a patient with dyspnea, but our data support the hypothesis that CUS can be a reliable modality for the clinical evaluation of these patients in the ED.

Maurizio Zanobetti, MD
Claudio Poggioni, MD
Riccardo Pini, MD
Florence, Italy

Affiliations: From the Intensive Observation Unit, Careggi University Hospital, and Department of Critical Care Medicine and Surgery, University of Florence.

Financial/nonfinancial disclosures: The authors have reported to CHEST that no potential conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

Correspondence to: Maurizio Zanobetti, MD, Intensive Observation Unit, Careggi University Hospital, and Department of Critical Care Medicine and Surgery, University of Florence, Largo Brambilla, 3, 50134 Florence, Italy; e-mail: zanoman@libero.it

DOI: 10.1378/chest.11-1649