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The Learners' Voice

Trainee Perceptions of Ultrasound Training

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The current generation of pulmonary and critical care trainees know only a world in which bedside ultrasound scanning is a necessary component of many diagnostic and invasive procedures; however, the ubiquity of ultrasound scanning is a relatively recent phenomenon worldwide. In their 2003 guidelines for the insertion of an intercostal catheter, for example, the British Thoracic Society Pleural Disease Group listed ultrasonography along with fluoroscopy and CT scanning only as “adjunctive guides to the site of tube placement.”¹

Ultrasound was recommended for use in the setting of small effusions or failed blind aspiration. In the combined American College of Chest Physicians and *La Société de Réanimation de Langue Française* statement published in 2009, Mayo et al² provided an overview of the elements of ultrasonography required to achieve competence. This document was considered the foundation for an International Expert Statement released in 2011 by a group that represented 11 critical care societies.³ The increasing adoption of bedside and procedural ultrasound scanning in the decade since then has had significant ramifications for trainee supervision, curriculum design, assessment of competence, and credentialing.

One barrier to ultrasound education and training that has been identified consistently in the literature has been accessing faculty with ultrasound expertise. In 2017,

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Sivakumar et al⁴ reported the results of a survey in the United Kingdom in which 59% of trainees said that they were rarely or never supervised while performing thoracic ultrasound scanning, and over 27% reported that their radiology colleagues were “not willing to provide training.” A similar study published by Eisen et al⁵ in 2010 found that many institutions did not have sufficient faculty with ultrasound proficiency. Educators have developed and published a variety of approaches to teaching ultrasound scanning and assessing competence to address perceived deficiencies. In their 2018 systematic review, Pietersen et al⁶ reported that the literature describes interventions that range from single workshops to a series of didactic lectures and multiday courses with live examinations of healthy live models. Variations between countries, regions, programs, and institutions mean that there will not be one best educational model; however, it seems likely that multimodal approaches to ultrasound education will become most common.

In this issue of *CHEST*, Brady et al⁷ present the results of a survey of fellows in Pulmonary and Critical Care Medicine Fellowship training in the United States, which was administered in February 2017. The anonymous survey was disseminated to member programs of the Association of Pulmonary and Critical Care Medicine Program Directors and then distributed to fellows on a voluntary basis by program directors. With 475 complete responses, their sample represents almost 24% of that year's combined cohort of pulmonary and critical care medicine, critical care medicine, and pulmonary fellows according to data from the Accreditation Council for Graduate Medical Education,⁸ and they achieved similar representation across stages of training. Fellows reported that limited faculty expertise in bedside ultrasound supervision was the most common barrier to their acquisition of this skill. Other commonly reported obstacles included the lack of a formal curriculum and lack of time. Although image review with expert faculty was the least common method (26.1%) reported for learning ultrasound techniques, it was associated consistently with fellows' self-reported comfort with performing various ultrasound examinations.

The choice to measure self-reported comfort with performing bedside ultrasound scanning and

ultrasound-guided procedures aligns with their method: a survey asking trainees for their perceptions of their training. However, comfort or confidence does not correlate necessarily with competence, an issue that Brady et al⁷ explore. Standardized methods for assessing procedural skills are available and continue to be developed and published.⁹ Although the reliability and validity of such assessment tools may vary with the populations in which they are used, it can be expected that future entrustment decisions will depend at least partially upon them as they become more widely accepted. However, there is already local variation in implementation. The British Thoracic Society Training Standards, for example, rely heavily on institutional expertise and direct observation of procedures.¹⁰ The Thoracic Society of Australia and New Zealand, however, recommends the Ultrasound-Guided Thoracentesis Skills and Tasks Assessment Tool (UG-STAT) for both formative and summative assessment of competence in their position paper on recognition of competence in thoracic ultrasound scanning.¹¹

Expert faculty review of images is recommended for discussion of difficult cases, ongoing learning, supervision for credentialing, and quality control.^{2,6,10,12,13} Whether it is by sonographers, radiologists, or pulmonologists with appropriate skill, this is an established standard for ultrasound training with widespread support. The results reported by Brady et al⁷ suggest a consistent relationship between expert review and learner comfort. They are right to describe their finding that expert review was available to just 26% of their respondents as “problematic,” and one hopes this might have improved in the years since their survey.

Finally, in the cohort of Brady et al,⁷ 90.5% of respondents were from programs with six or more fellows, and almost 30% were from one with at least 16 fellows; trainees from smaller training programs reported more difficulty with access to ultrasound machines. Many training programs worldwide are smaller than those represented in this study, and one wonders about the effect of access to devices on training in countries where the price of an ultrasound machine is prohibitive. If best practice is to use ultrasound for diagnostic assistance and procedural guidance, how can we support programs and trainees with less access to both devices and qualified supervisors? CHEST partially addresses this need, with hands-on programs at the Annual Meeting an example of providing access to

expert supervision and feedback on skill performance, and Certificate of Completion Programs are also available. Partnerships among training programs, professional bodies, and private contractors might be necessary to address gaps.¹³

One might argue that, as our current trainees become faculty, the issue of inadequate supervision for new trainees will reduce; indeed, Eisen et al⁵ made this reasonable suggestion in their 2010 article. Unfortunately, Sivakumar et al⁴ and now Brady et al⁷ demonstrate that, by 2017, this had not occurred. Ongoing efforts to ensure trainee learning (and, ultimately, patient safety) are required to overcome this deficiency.

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