Checklists and Clinical Competency

Getting to the Heart of the Matter

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Technological advancements in diagnostic medicine create both opportunities and challenges in medical education at all levels. This has been true since John Forbes dismissed the stethoscope as a gimmick that would "never come into general use . . . because its beneficial application requires much time and gives a good bit of trouble to both the patient and the practitioner" or when Sir William Osler lamented time students spent looking at lab values instead of listening to the patient at the bedside (1, 2). Point-of-care ultrasound (POCUS) follows in this long-standing tradition as medical schools and residency training programs across the country race to integrate POCUS into their curricula and the pressure to train and certify sufficient faculty to supervise learners grows (3, 4). The integration of POCUS into clinical care and medical education raises important questions about how we define and determine competency to perform, interpret, and supervise POCUS examinations (5). Easily quantifiable measures, such as the number of hours of training or number of clinical encounters, are insufficient predictors of clinical competency, although they continue to form the backbone of many existing certification processes (6).

Methods of assessment that measure knowledge, such as multiple-choice questions, may achieve standardization but do not necessarily predict the ability to put clinical skills into practice (7). On the other hand, methods of assessment that include observations of direct or indirect patient encounters are subject to the inherent variability of real-world patient presentations as well as to the implicit biases ingrained in the observer (8). Moreover, extracting useful information from observed encounters requires the evaluator to be an expert in both the subject matter being evaluated as well as the process of meaningful evaluation. POCUS adds an additional layer of complexity in competency assessment because of the inherent interdependence of technical skill and clinical reasoning. A comprehensive assessment tool for POCUS would ideally assess knowledge of indications for ultrasound, technical skill in the acquisition of images, accuracy of image interpretation, and, perhaps most importantly, appropriate incorporation of ultrasound findings into clinical decision-making.

Apart from the clearly demonstrated benefits of standardization to procedural safety and processes of care, checklists have become a common tool in competency

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assessment. Standardized checklists allow for the comparison of learners across training sites, decrease the burden in establishing competency of practicing clinicians, and provide a means to monitor retention of clinical skills over time. Standardization can guide curriculum development at institutions without established training programs and provide a mechanism for the assessment of curriculum goals. It provides transparency to learners, who deserve to know the criteria by which they will be evaluated, and mitigates implicit biases that have been documented in other assessment modalities. The challenge is that the creation of a serviceable checklist requires a fundamental understanding of the discrete individual steps that constitute the process being evaluated (9). Checklist items that are improperly broad or vaguely defined can maintain an illusion of standardization on the surface while sowing subjectivity and confusion in practice.

In their article "Development of a Focused Cardiac Ultrasound Image Acquisition Assessment Tool" in this issue of *ATS Scholar*, Adamson and colleagues provide a modified Delphi method to mine procedural understanding from a multidisciplinary collection of experts (10). The result is a standardized checklist for the assessment of technical skill in the acquisition of cardiac images. This tool is not intended to reach beyond image acquisition into the realms of image interpretation or clinical integration. Although the number of items in the final checklist (62 items) appears initially daunting, the authors successfully break down a sophisticated procedure into clearly defined and finite steps. They present a one-page version that can be completed fairly rapidly and does not impose an undue burden on either the learner or the examiner. Achieving shared consensus among a multidisciplinary team of luminaries about a procedure that has been a historical battleground between specialties is no small feat and should be applauded. This study also provides a greater degree of specificity than prior similar attempts concerning competence in echocardiography (6, 11, 12).

However, there are limitations to both the methodology and the final product. Delphi consensus continues to be heavily influenced by the initial list of proposed items and the specifics of group moderation (13). Although the initial list was extensive, it is unclear whether a systematic methodology was applied to extract this list from existing data. Practical application of this tool moving forward would require an assessment of interobserver reliability as well as an understanding of the threshold at which a learner graduates from requiring hands-on supervision through the levels of entrustment to independent practice and excellence. In the end, although this tool appears to capture the most important points in image acquisition, it does not venture into the more challenging area of clinical reasoning. With an increasing number of software packages providing automatic grading or guidance in image acquisition, the difference between a technician and clinician in not just acquiring clinical images but in also interpreting and integrating them with other clinical data into a clinical assessment becomes much more important (14). This checklist breaks down the process of image acquisition into the most discrete and quantifiable steps, but the harder problem of how to assess the ability to interpret those acquired images and to integrate them into clinical decision-making remains.

The fundamental benefit of POCUS over a traditional ultrasound examination obtained by a sonographer and interpreted by a radiologist is the ability for the clinician caring for the patient to ask a

clinical question and answer that question in real time at the bedside by using ultrasound data in conjunction with other clinical data (15). The ability to reliably acquire images is essential, and the tool published in this issue presents an excellent step toward a standardized methodology in doing so. However, the exciting parts are yet to come. The mission continues toward a tool that is validated through application to learners of all levels, provides discrimination between competence and excellence, and comprehensively evaluates all components of POCUS from indication to acquisition, interpretation, and, finally, clinical decision-making.

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