Expanded Use of Point of Care Ultrasound Curriculum for Attending Physicians

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Background

Ultrasound education has been highlighted in the ACGME core curriculum for the emergency medicine residents yet there is a gap in the desired goal of having all attending emergency physicians credentialed in the performance of expanded point of care ultrasound applications. The goal of this curriculum was to maximize the number of attending physicians credentialed in expanded point of care ultrasound (POCUS) applications.

Material and Methods

A rapid education event (REE) to maximize the learning of the intended content was created for attending physicians at our institution. It was approved for continuing medical education credits (CME) was exempt from institutional review board (IRB) oversight.

1. Four 4 standardized patients (SPs) were contracted for a 2-hour period.
2. Four ultrasound machines were utilized.
3. Four ultrasound faculty members and 1 ultrasound fellow were REE faculty.

The 4 hour curriculum focused on the below objectives.

1. Illustrate the use of lung ultrasound in the dyspneic patient using the BEE FIRST/ "Simple as 123" algorithms, list appropriate indications, identify acceptable probe choice for the examination and list at least three pathologic findings on lung ultrasound.
2. Define how limited cardiac and expanded cardiac POCUS are distinguished. Identify appropriate probes, lists at least two indications, and be able to recognize at least two standard cardiac views.
3. Distinguish the E-Fast exam from the FAST examination. Demonstrate knowledge of the standard images required for billing. Identify appropriate probes, list two indications, and demonstrate the interpretations for each standard view.
4. Define the protocol of scanning the abdominal aorta for the identification of normal vs. aneurysmal diameter at the bedside. List at least one indication for POCUS of the aorta, identify the correct probes, and list the three views required for the protocol.

The other required examinations for credentialing, after this planned educational event, was to be supplemented through physician educational 'rounds' and 'on shift' evaluation of their image quality and acceptability by credentialed colleagues and faculty.

Course Development

Two phases of the curriculum:

1. Using introductory live didactic content and images of both normal and abnormal anatomy, learners were introduced the specific POCUS procedures.
2. Immediately following, a hands-on practice session with SPs allowed the learners to practice identifying the correct equipment, become proficient in identifying normal anatomy of the scanned body part, and the images required for billing.

Assessment of the efficacy of the program:

1) The learners were graded on indications, probes, required views and documentation requirements. (See Table 1) The rubric was based on the Emergency Ultrasound Imaging Criteria Compendium ACEP Guidelines.
   a. Our goal was for 90% of the participants to pass a post program assessment demonstrating competency in the objectives with a score of 80% or higher.
   b. Additionally, we set out to have 100% of the participants complete a supervised POCUS by an ultrasound faculty. (Figure 1)

Evaluation

1. Evaluation of the course was completed with open-ended questions about what went well during the activity, what would make it more meaningful, and what were the opportunities for improvement.
2. Further evaluation was with yes/no questions regarding the participants likelihood of using and teaching the material as well as their perception on their ability to complete the exams.

Figure 1: Instructors demonstrating the correct placement of the probe during an echo procedure.

Results

Thirteen attending physicians participated in the voluntary education session, 12 were EM physicians and 1 was an EM/PEM physician. Sixty-two percent of the learners (N=8) were male, and thirty-eight percent (N=5) were female.

The mean pre-test score was 8.385/12 or 69.8%. The mean post test score was 9.62/12 or 80%.

Eighty-three percent (N=10) scored an 80% or greater on the post-test.

Sixty-nine percent (N=9) showed improvement in comparison to their pre-test scores, 23%(N=3) had no change in their score, and 8% (N=1) had a decrease in their score.

The majority (85%, N=11) completed direct observation of lung, FAST, and echo exams. Data was missing from 15% of the learners (N=2) due to either abstention from observation or failure to turn in their observation checklist at the completion of the course. Ninety-two percent (N=12) completed the direct observation of the aorta exam, data was missing from 8% (N=1) of the participants who did not turn in their observation checklist. No learner required remediation for any of the exams that were proctored.

The program evaluation showed 92% (N=12) of participants felt the faculty showed adequate knowledge of the material, that they were likely to expand your use of ultrasound on shift, and were more likely to teach the residents ultrasound applications after this education event. One participant did not respond to those questions.

Thirteen participants (100%) felt that after this course they could illustrate a lung ultrasound and define the differences between limited and expanded echo the algorithm described in the session. 100% agreed they could distinguish between a FAST and an E-FAST and identify the images required for billing. 100% agreed they could distinguish an aneurysmal vs. non-aneurysmal aorta on their next abdominal ultrasound.

Discussion and Future Steps

While most of the participants were able to meet course threshold scores, the objective of 90% of participants passing the post-test with greater than 80% was not achieved. However, nearly 2/3 of the participants were able to show improvement from pre-test scores.

The majority of participants did complete a directly observed procedure by faculty for the lung, echo, and fast exams, yet the goal of attaining 100% direct observation of each procedure by each participant was not completed. Evaluating learner preferences for being observed and more optimal data collecting strategies might improve these outcomes in future endeavors.

TABLE 1: EXAMPLE OF DIRECT OBSERVATION RUBRIC.

Evaluator: Date:

Participant:

Aorta Skills Assessment	Answer	Rating: (2) Satisfactory, (1) Incomplete, (0) Fail	Key
Indication (verbalizes)	Abdominal pain Hypotension		**Satisfactory:** Lists at least one indication for an aorta POCUS **Fail:** Cannot list an indication for an aorta POCUS
Correct probe	Curvilinear or phased array		**Satisfactory:** Lists at least once correct probe **Fail:** Cannot identify a correct probe
Views required	Proximal, mid, distal and bifurcation in both transverse and longitudinal planes. Presence or absence of aneurysm should be documented. Views of the celiac artery, SMA and bifurcation are helpful but not required.		**Satisfactory:** Lists all 3 anatomical views required and verbalizes the need for 2 planes **Incomplete:** Lists < 3 views required or does not verbalize the need for 2 planes **Fail:** Cannot identify any of the 3 appropriate views
Documentation Required	Interpretation should note presence of absence of sonographic evidence of aneurysm and diameter if present.		**Satisfactory:** Lists the correct diameter interpretation of an aneurysm (>3 cm) **Fail:** Cannot verbalize the aneurysm sizing

Comments: (list all reasons for incomplete or fail)

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