



Figure 2.

44 Low-Cost, Ultrasound-Compatible Paracentesis Model for Medical Trainees

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Introduction/Background: Paracentesis is an important procedure as physicians are poor predictors of spontaneous bacterial peritonitis. Simulation-based education has improved procedural skills training and decreased morbidity associated with invasive procedures. Deliberate practice with an ultrasound-compatible paracentesis simulator significantly improved resident procedural competence. Low-cost, ultrasound-compatible models for pericardiocentesis have been developed. We developed a low-cost, ultrasound-compatible model for medical trainees to perform paracenteses.

Objectives:

1. Review and model anatomic considerations when performing bedside paracentesis.
2. Develop a reproducible, ultrasound-compatible model that is efficient to use as an educational intervention.

Curricular Design: A prototype of our model was tested by medical students at Oregon Health and Science University under faculty supervision and all trainees obtained “peritoneal fluid.” The model was then revised to make it ultrasound-compatible. We propose that this model be utilized in conjunction with additional education interventions including an online video paracentesis tutorial; an educational session reviewing indications for, benefits/risks of, and procedure set-up for paracentesis; and an outcome measurement of self-perceived competence and improved understanding of the tactile feedback necessary for this procedure.

Materials:

Whoopie cushion (12 pk \$7)
 Animal Twist and Shape Balloons (25/pk \$2.50; 144/pk \$10)
 Vegetable oil (\$1.50)
 Sink
 60mL syringe
 Flesh-colored 9x11 sheets of felt (\$0.99/sheet)
 1-inch Binder Clip (24/pk \$3)
 12-inch basin (Medline \$3)
 Paracentesis kit (18 G needle, syringe)
 Ultrasound

Impact: Simulation training can improve procedural skills and patient care. Prior non-commercial, paracentesis models are limited by their expense, time, faculty commitment and tool availability. Our simulator is low-cost, easy-to-assemble, ultrasound-compatible, and well-received by medical trainees.



Figure 1.



Figure 2.

45 Mapping Emergency Medicine Milestones to an Existing Simulation Curriculum

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Background: The Accreditation Council for Graduate Medical Education defines milestones that all residents are expected to meet. Program directors must develop methods to

evaluate resident milestones as they progress in their training. The unpredictable nature of clinical practice can create significant variability in patterns of skill use over short time periods necessitating other methods of evaluation. Simulation has been well accepted in emergency medicine (EM) resident education, but it is unknown to what extent milestones are represented in current simulation curricula.

Objectives: To determine how frequently an existing simulation curriculum incorporates each of the EM milestones.

Methods: The EM simulation curriculum at our institution was developed before milestone implementation and includes 63 unique cases. Each case was reviewed by one of the faculty members on the EM simulation committee. Reviewers determined whether the case incorporates each of the twenty-three EM milestones and the levels incorporated. An EM faculty member from outside the institution similarly reviewed each case. Inter-rater reliability was calculated as kappa.

Results: Twenty-two of the twenty-three EM milestones are incorporated in the simulation curriculum. Twenty-one are represented at more than one level. Individual milestones are incorporated in a mean of 44.7 and median of 59 cases over the three year curriculum. Overall inter-rater reliability was $\kappa=0.791$.

Conclusions: This simulation curriculum incorporates a majority of the emergency medicine milestones frequently and at multiple levels. Simulation has the potential to be a useful tool for evaluating EM residents with respect to the milestones as they progress through training. Existing resources may be able to provide a means to achieve assessment of milestones, precluding the need to spend time designing new methods of assessment. Other EM programs should assess their simulation curriculum as a potential method of tracking resident progress on milestones.

46 Measuring the Effects of Stress on Emergency Medicine Resident Performance of Critical Procedures Utilizing a Fresh Tissue Cadaver Lab

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Introduction/Background: Many emergency medicine (EM) residency programs use simulation for procedural training. However, there is less literature on the role of fresh tissue cadavers (FTC), which have higher fidelity than task simulators for performing procedures on patients. Moreover, studies show that increased stress and workload adversely affect fine motor function and can increase overall errors in task performance. By combining external stressors with invasive procedural practice on FTCs, we create a learning environment that most closely resembles clinical practice.

Educational Objective: We aim to provide procedural teaching for residents in an environment that most closely resembles a true EM resuscitation. We also aim to address

the effects of external stressors on resident procedural performance and error rates.

Curricular Design: We run a fresh tissue cadaver lab twice monthly, with 4-6 resident participants per session. One faculty facilitator provides simulated clinical cases requiring critical procedures. Each resident is randomized to either non-stressful or stressful conditions (loud ambient noise, verbal pressure, monitors with alarms, and announcement of critical vital signs). Each session is video-recorded, and the faculty rates resident performance with a critical actions checklist and a validated assessment tool for clinical performance, the Ottawa Global Rating Scale. Time to procedural task completion is also recorded. Verbal debriefing and written surveys are completed post-simulation.

Impact/Effectiveness: Error is ubiquitous in medicine, particularly during critical events and resuscitation. By using a fresh tissue cadaver lab with external stressors, we provide the highest fidelity in simulating procedural training, to identify areas of improvement, with the ultimate goal of maximizing patient safety.

47 Medical Student Core Clinical Ultrasound Milestones: A Consensus Among Directors in the United States

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Purpose: To formulate a consensus on core medical student clinical ultrasound milestones among ultrasound in medical education (USMED) directors across the United States.

Methods: An initial list of 204 potential clinical ultrasound milestones was developed through a literature review. An expert panel consisting of 34 USMED directors across the United States was used to produce consensus on clinical ultrasound milestones through two rounds of a modified Delphi technique.

Results: There was 100% response rate from the 34 USMED directors in both round 1 and round 2 of the modified Delphi protocol. After the first round, 205 milestones were revised to improve clarity and 9 milestones were added resulting in 214 milestones forwarded to round 2. After the second round, 90 milestones were found to have high level of agreement and were included in the final medical student core clinical ultrasound milestones.

Conclusions: The results of this study establish 90 core clinical milestones that all graduating medical students should obtain prior to graduation. These core milestones can serve as a guide for curriculum deans who are initiating ultrasound curricula at their institutions.