UC Irvine

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health

Title

A Low Cost Yet Realistic Tube Thoracostomy Model for Emergency Medicine Resident Training

Permalink

https://escholarship.org/uc/item/39d979cj

Journal

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 16(4.1)

ISSN

1936-900X

Authors

Lewis, N.
Vitto, M.

Publication Date

2015

Copyright Information

rting this card the resident is allowed to perform the punched procedures as explar

Attending supervision needed Steps 1 & 2

Step 1: Resident Physician has completed didactic test on the indications, contraindications, and troubleshooting strategies associated with the procedure.

Step 2: Resident physician has completed the procedure under supervision of an attending physician (either in person or on video tape) with the use of a high-fidelity simulator and performed all critical actions. The resident may NOW perform this procedure
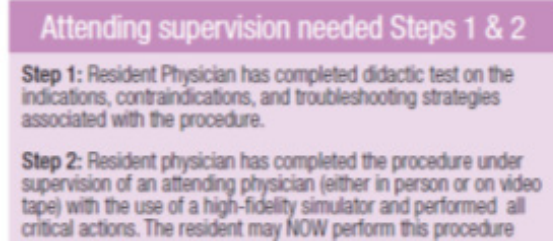
Figure 2.

3 A Dedicated EBM Curriculum Integrated into Journal Club Increases and Sustains EBM Competency: An Innovation in EBM Curriculum

Kluesner N / University of Iowa Hospitals and Clinics, Iowa City, IA

Introduction: With the increasing volume of clinical evidence available to practitioners, curricula designed to teach residents the principles of evidence-based medicine (EBM) and knowledge translation have become a significant focus throughout graduate medical education. The method to best deliver these needed skills has been an area of active research and innovation.

Educational Objectives: The goal was to develop a dedicated EBM curriculum implemented as part of a monthly journal club on EBM competency. We hypothesized that integrating EBM principles into a novel and revised journal club format would increase EBM competency, and that these educational gains could be sustained.

Curricular Design: A formal EBM curriculum was implemented utilizing a four-pronged approach: 1) peer instruction model and peer to peer discussion coordinated by a teaching resident, 2) dedicated EBM lecture delivered at the beginning of each journal club, 3) identification of teaching residents who select articles consistent with EBM topic focus, and 4) core EBM faculty to deliver lectures and meet with teaching residents. An 18 month curriculum was adopted with this approach in June, 2012. The Fresno test, a validated instrument for assessing EBM competency, was administered to all residents annually, starting the year before implementation.

Effectiveness: A total of 22 respondents encompassed the pretest group, with 23 respondents in the year 1 post-test and 26 respondents in the year 2 post-test. A multivariable model using generalized estimating equations controlling for year of residency and repeated measures demonstrated a significant increase in performance from the pre-test data to the subsequent two post-test years (pre-test adjusted mean 110.16, year 1 adjusted mean: 127.82, year 2 adjusted mean 127.07, p=0.011). An EBM curriculum implemented as a part of journal club was an effective strategy for increasing competency, and improvements were sustained after implementation.

4 A High-Fidelity Porcine Model for Teaching Transvenous Pacing to Emergency Medicine Residents

Frawley T, Walsh R, Bothwell J / Madigan Army Medical Center, Tacoma, WA

Introduction: The Accreditation Council for Graduate Medical Education (ACGME) considers cardiac pacing a "key index procedure" for Emergency Medicine (EM) residents, requiring 6 pacing procedures during training. Because it is considered a "rare" procedure, the ACGME allows all 6 to be performed in the lab. Transvenous pacing (TVP), a subset of cardiac pacing, is technically challenging and requires training to develop competence. Many modalities have been described (bedside instruction, mannequins and instructional videos) but they are relatively low fidelity. To our knowledge, there are no commercially-available simulators for TVP training.

Educational Objective: We sought to use swine as a high-fidelity, anatomically and physiologically realistic training model for teaching TVP.

Curricular Design: We found anecdotally that swine make excellent models for teaching TVP. Once the internal jugular vein is cannulated, TVP can be performed in practically the usual manner. The internal jugular (IJ) catheter is placed under ultrasound guidance and remains secured in place between iterations. Thereafter, the process of inserting and advancing the pacer, and adjusting the rate and output are the same as in humans, and can be done multiple times on a single model. We monitor for pacer capture using a pulse oximeter, although cardiac monitoring may also be possible. Alternatively, direct visualization can be used if thoracotomy training is performed prior to TVP. To our knowledge, this is the first description of the porcine model to teach TVP to EM residents.

Impact/Effectiveness: The model allows multiple learners to perform multiple training iterations on the same day, of a procedure that is life-saving but infrequently encountered. We feel that this repetition allows learners to develop muscle memory and to solidify equipment familiarization. Finally, our porcine model provides residency programs another avenue for achieving ACGME requirements for this key index procedure.

5 A Low Cost Yet Realistic Tube Thoracostomy Model for Emergency Medicine Resident Training

Lewis N, Vitto M / Virginia Commonwealth University, Richmond, VA

Background: Emergent tube thoracostomy is a critical lifesaving procedure performed in the emergency department. Emergency medicine residents must be confident and experienced

in this procedure prior to graduation. Previous models including live animal labs and computerized manikins are expensive and can be difficult to run. We developed a low cost, easy-to-construct model using supplies readily available in the emergency department and pork spare ribs purchased from a grocery store.

Educational Objectives: The objectives of this model are 1) to provide emergency medicine residents with a life-like task trainer for hands-on practice in tube thoracostomy insertion, and 2) to provide an inexpensive alternative to high fidelity simulators while remaining reusable and easy to set up.

Curricular Design: Our model was created in order to provide residents with additional practice in tube thoracostomy insertion above that which they gain on actual patients. The model was created using a side of pork spare ribs wrapped in an absorbable chux pad and supported on its side by towel rolls. The outside of the model was then covered with a thin foam sheet from an arts and crafts store and secured with tape (Figure 1). After construction, we used the model along with a standard chest tube insertion kit in small group sessions. This allowed each resident to independently perform the procedure (Figure 2) and provided an opportunity to discuss basic chest tube management in a low stress environment.

Impact: Residents were not formally assessed, however they universally expressed benefit from the added procedural instruction. Further, the model allowed for realistic simulation of the entire procedure from the injection of anesthesia to the "pop" felt when entering the chest due to the intact fascia along the back of the ribs. In conclusion, our tube thoracostomy model presents a low cost yet realistic alternative to high fidelity simulation for tube thoracostomy instruction.
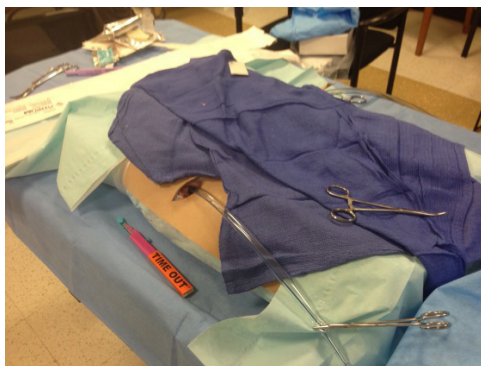

Figure 1.

Figure 2.

6 A Prospective Analysis of Milestone Integration into Resident Global Assessment

Lefebvre C, Hartman N, Hosmer K, Glass C, Hiestand B / Wake Forest School of Medicine, Winston Salem, NC

Background: End-of-shift (EoS) evaluations including questions regarding milestone achievement are commonly used by Emergency Medicine (EM) training programs. There is little objective evidence regarding the integration of milestone achievement into existing evaluation strategies. This prospective observational study compared faculty assessments of resident global performance to assessment by a clinical competency committee (CCC) using EoS milestone data.

Methods: Surveys were distributed to faculty members, asking for a global performance score (1-6) for each resident. The score assigned to the resident was the average of the faculty responses. Milestone data was collected by an EoS evaluation tool, already in use at the institution, from January-June 2014. Free-text comments were also collected during these EoS encounters. The CCC, blinded to resident identity, assigned a performance score (1-6) to each resident based solely on EoS milestone scores. Scoring was repeated after including free-text comments to the milestone scores. Correlation between scores was assessed by Spearman's rho.

Results: 31/42 faculty participated in the survey. 43 EM residents were evaluated by the faculty and CCC. Mean performance scores: milestone-only data (MO)=3.76 (range 2-5), milestone plus free text comments (MFT)=4.2 (range 3-6), survey based faculty assessment (FA)=4.38 (range 3.5-5.4). Spearman's rho for FA and MO scores was -0.11, demonstrating no significant correlation (p=0.49), while rho for FA and MFT scores was 0.4173 (p=0.007), indicating significant correlation.

Conclusions: Subjective information in the form of faculty comments at the EoS may describe performance elements not adequately measured by milestone assessments. There was stronger correlation between the CCC and faculty scores when milestone data was combined with the subjective observations of supervising faculty. Other tools for resident assessment are necessary to supplement milestone achievement scores.

7 A Simulation Based Approach to Disaster and Triage Training

Masters M, Crosby J, Thompson R, Lohmeier M / University of Wisconsin Hospital and Clinics, Madison, WI

Background: There is a dearth of residency training in disaster medicine and techniques involved in triaging mass-casualty incidents (MCIs). Furthermore, due to variability and infrequency of MCIs, residents lack experiential practice.

Educational Objective: To create a simulation experience that improves practitioner confidence and skill