P-C-03

Research Abstracts

Low-Cost Emergency Department Thoracotomy Simulation Improves Surgical Residents Confidence and Knowledge

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Introduction: Emergency Department Thoracotomy (EDT) is a potentially life-saving procedure performed for traumatically injured patients in cardiac arrest. EDT is both an uncommon and complex procedure; therefore, surgical residents often feel unprepared to perform them. To address this, we created a medium-fidelity task trainer to allow the residents to participate in an interactive simulation session facilitated by a trauma surgeon in an environment that was more conducive to learning. We hypothesized simulation with this model would improve residents' confidence and knowledge.

Methods: A low-cost (~$200 dollars) EDT simulation model was developed utilizing mostly off-the-shelf components (Figure). This model allowed the practice of key portions of the procedure including incision placement, use of retractors, opening of the pericardium, cardiac massage, clamping the aorta, and sternal division with a Lebsche knife. Postgraduate year 4 general residents participated in a 90-minute simulation with this model. Beforehand, an anonymous Qualtrics survey assessed their experience, confidence (Likert scale 1-5), and knowledge (10 multiple choice questions). The same survey was administered a week after simulation. Paired t-tests compared responses, a=0.05.

Results: Seven (7) residents participated. Zero had performed an EDT prior to the simulation. All completed the pre-simulation survey and 6/7 (83%) completed the post-simulation survey. Pre-simulation, overall confidence was low (average 1.6/5, 1=lowest confidence). This improved to 3.0/5 post-simulation (p=0.03). When confidence was analyzed by each step of the EDT, all post-simulation scores were higher suggesting increased confidence; however, only mobilizing the lung (p<0.01) and performing a clamshell (p<0.02) were statistically significant. Resident knowledge increased (pre-simulation score 41%, post-simulation 58%, p=0.04).

Conclusions: A short simulation session with a low-cost EDT model improved surgical resident confidence and knowledge. While these results are limited by a small study size, additional confirmation studies are planned. Additionally, it's unknown how resident confidence will translate into clinical outcomes.