

Impact of a Mobile Application for ACLS on House Staff Performance During Cardiac Arrest Simulations

Authors: Ali O Malik, Vittal Hejjaji, Poghni Peri-Okonny, Yuanyuan Tang, Merrill Thomas, David Wooldridge, Paul S Chan

Originally published: 4 Apr 2019

Circulation: Cardiovascular Quality and Outcomes. ;12:A33

BACKGROUND:

Effective and timely delivery of cardiac arrest interventions during a resuscitation for in-hospital cardiac arrest (IHCA) is associated with a higher likelihood of survival. House staff play a pivotal role in leading resuscitations during IHCA. Whether a mobile application (App) that provides real-time reminders and dosing recommendations for defibrillation and vasoactive medications improves adherence to ACLS guidelines remains unknown.

METHODS:

As part of a quality improvement initiative, internal medicine residents at Saint Luke's Mid America Heart Institute underwent two different cardiac arrest simulations and were randomized to do one simulation with the App and one without. All simulations included 4 rhythm cycles and were video recorded to ensure accuracy in endpoint assessments. The co-primary endpoints were chest compression fraction (i.e., time doing chest compressions / total time of the simulation) and number of correct interventions (e.g., defibrillation, epinephrine or amiodarone within the correct time frame and with accurate dosing) out of 7 in each simulation. The secondary endpoint was incorrect interventions, defined as interventions not indicated by ACLS guidelines (e.g., atropine for asystole). Paired t-tests compared performance with and without the App.

RESULTS:

Among 53 residents, 26 were randomized to do the first simulation with the App and 27 without the App. Use of the App was associated with a higher number of correct ACLS interventions (out of 7): mean of 6.2 vs. 5.1; absolute difference of 1.1 (95% CI: 0.6, 1.6); $P < 0.001$) as well as fewer incorrect ACLS interventions (mean of 0.3 vs. 1.0; absolute difference of -0.7 (95% CI: -0.3, -1.0); $P < 0.001$). Simulations performed with the App also had a marginally higher chest compression fraction (mean: 90.9% vs. 89.0%; absolute difference 2.0% (95% CI: 0.6%, 3.4%; $P = 0.007$).

CONCLUSION:

Use of a mobile application by residents during simulations was associated with better adherence to ACLS performance measures. This proof-of-concept study suggests this novel mobile App may improve adherence to ACLS, but its effectiveness on survival in real-world resuscitations remains unknown.

Table 1. Comparison of primary outcomes.

	With App	Without App	Difference with App (95% CI)	P value
Compression Fraction	90.9% ± 2.3%	89.0% ± 5.0%	2.0% ± (0.6%, 3.4%)	0.007
Number of Correct Interventions				
Mean (SD)	6.2 (1.1)	5.1 (1.6)	1.1 (0.6, 1.6)	<0.001
Number of Incorrect Interventions				
Mean (SD)	0.3 (0.6)	1.0 (1.3)	-0.7 (-0.3, -1.0)	<0.001



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