Pharmacist Impact on Advanced Cardiac Life Support Compliance During In-Hospital Cardiac Arrest

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Background

The advanced cardiac life support (ACLS) guidelines are authored by the American Heart Association and provide specific algorithms for the treatment of patients suffering from cardiac arrest.[1] Use of these guidelines are universally employed due to their clear pathways for use of evidence based treatments. Over recent years pharmacists have been integrated into response teams in hospitals throughout the United States.[2] Pharmacists can offer a different perspective than that of a physician or nurse in emergent situations. Even experienced code teams do not demonstrate perfect compliance with the ACLS guidelines.[3] The expertise of a pharmacist helps optimize drug dosing, selection, timing, and administration in these situations.

Community Medical Center is a 596 bed community hospital with a large geriatric population. Many of these patients suffer from multiple disease states and are at an increased risk for cardiac arrests. Currently there is no 24 hour coverage for cardiac arrests however, clinical pharmacists and pharmacy residents respond when available.

Objective

To evaluate the impact of pharmacist presence on compliance to the ACLS guidelines, in reference to medication selection, dose, and timing.

Methods

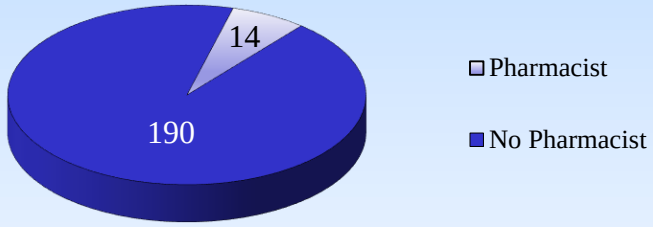
This retrospective review identified patients over the age of 18 years old who experienced in-hospital cardiac arrests between September 1, 2014 and August 31, 2015. The primary outcome of this study was to compare compliance with ACLS guidelines during cardiac arrest when a pharmacist was present compared to cardiac arrests when no pharmacist was present. Secondary outcomes will identify the total number of deviations for each group, as well as patient mortality between the two groups. Compliance was defined as the correct medication for that indication, the correct dose, and the correct timing of doses. Data was collected from cardiac arrest code sheets and the electronic medical record (EMR) system Cerner™. Student's t-test was utilized to evaluate continuous data and Fisher's exact test was utilized for nominal data. All data was recorded without identifiers and kept confidential. This study was submitted and approved by the Institutional Review Board at Community Medical Center.

Results

Table 1. Demographics

	Pharmacist Presence *n = 34*	No Pharmacist Presence *n = 201*	P-value
Male (%)	23 (67.6%)	130 (64.7%)	0.847
Age (years) (± SD)	72.9 (± 16.1)	72.8 (± 14.6)	0.974
General Medicine Floors (%)	6 (17.6%)	76 (37.8%)	0.031
ICU (%)	9 (26.5%)	75 (37.3%)	0.251
Emergency Department (%)	19 (55.9%)	50 (24.9%)	< 0.001
Average Length of Code (minutes) (± SD)	16.5 (± 8.5)	17.2 (± 10.8)	0.699

Total Deviations



Source of Deviation

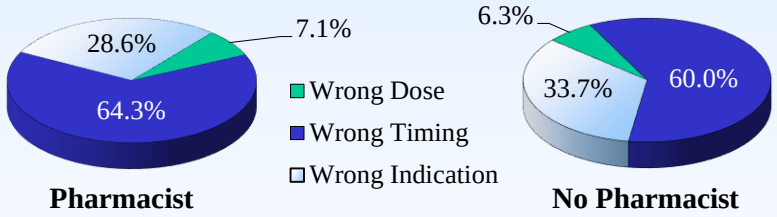


Table 2. Results

	Pharmacist Presence *n = 34*	No Pharmacist Presence *n = 201*	P-value
Compliance (%)	25 (73.5%)	79 (39.3%)	< 0.001
Total Deviations (per 100)	14 (41)	190 (94)	< 0.001
Patient Mortality (%)	15 (44.1%)	110 (54.7%)	0.270

Disclosure
The authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation. J. Cavanaugh: nothing to disclose; J. Sullivan: nothing to disclose; J. Nodzon: nothing to disclose; N. East: nothing to disclose; A. Vassallo: nothing to disclose; S. Barlow: nothing to disclose.

Results

A total of 235 cardiac arrests met inclusion criteria. Of those, 34 cardiac arrests had documented pharmacy presence and 201 had no pharmacist present. Overall compliance with the 2010 ACLS guidelines was maintained in 25 out of 34 (73.5%) cardiac arrests in the pharmacist arm compared to 79 out 201 in the no pharmacist arm ($p<0.001$). A total of 204 deviations occurred. 14 deviations (42 per 100 arrests) occurred with a pharmacist present and 190 deviations (94 per 100 arrests) occurred when no pharmacist was present ($p<0.001$). 15 patients (44.1%) in the pharmacist arm expired compared to 110 (54.7%) in the non pharmacist arm ($p=0.270$).

Sources of deviation included wrong drug based on indication, wrong timing, and wrong dose. 7.1%, 64.3%, and 28.6% of deviations in the pharmacist arm were due to dose, timing, and indication, respectively. The no pharmacist arm had 6.3%, 60%, and 33.7% of deviations due to dose, timing, and indication, respectively.

Discussion

Pharmacist presence nearly doubled compliance with the ACLS guidelines. The clinical value of a pharmacist was most clearly demonstrated by total guideline deviations. When normalized to 100 cardiac arrests, pharmacist presence resulted in less than half as many deviations than when no pharmacist was present. Pharmacist presence did not have an effect on patient mortality. It is important to note that there is currently a greater pharmacy presence in the emergency department than in other parts of the hospital.

There are limitations to this study. The data was attained based on what was documented during the cardiac arrest. Any charting errors or lack of documentation could have confounded the data. The results of this study exemplify the value of a pharmacist and the need for pharmacy presence during cardiac arrests.

Conclusion

Pharmacist presence significantly increased compliance with the ACLS guidelines.

References

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