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Telecommunicator CPR Intervention Improves Recognition of Cardiac Arrest and Time to First Chest Compression

John Sutter, MS1
University of Arizona College of Medicine - Phoenix
Co-Investigators:

- Blake Langlais
- Christian Dameff, MD
- Jeffrey Tully, MD
- Micah Panczyk, MS
- Vatsal Chikani, MPH
- Tyler Vadeboncoeur, MD
- Daniel W. Spaite, MD
- Bentley J. Bobrow, MD, FAHA
Background

- Bystander CPR (BCPR) rates in the United States remain low

- Approximately 40% of all out-of-hospital cardiac arrest (OHCA) cases\(^1\)

- Regional variability for OHCA outcomes exists \(^2\)

- Telecommunicator CPR (TCPR) is associated with improved BCPR rates and increased survival \(^3\)

- Implementation of TCPR varies widely and few centers measure the process \(^4\)

1. McNally 2011  
2. Nichol et al. 2008  
4. Sutter et al. 2015
Methods

- Prospective before-after observational intervention study
- P1 vs. P2

- 9-1-1 audio recordings of suspected cardiac arrest cases were analyzed
  - P1: 10/05/2010 – 11/06/2011
Statistical Methods

- SAS v9.3 (SAS Institute, Inc., Cary, NC)
- Rates and time intervals reported as frequency (%) and median (Q1, Q3)
- Mantel-Haenszel Chi-Square test: difference in proportion between P1 and P2 phase
- Non-parametric Mann-Whitney-Wilcoxon: difference in median time intervals between P1 and P2 phase
- A p-value of <0.05 is considered significant
Study Endpoints

- Primary Endpoints: Telecommunicator CPR Process Metrics
Inclusion Criteria for Endpoints

- All suspected OHCA events
  - Calls assigned a “call type”
    - “Code” designation
    - Retrospective amendment of cases where a “code” was not described by the caller

- Not included:
  - CPR was already in progress
  - Spatial limitations on caller
  - Physical limitations on caller
Setting

- A combined fire, EMS, and law enforcement dispatch center
  - Mesa, AZ
  - Serving approximately 712,000 people
  - Receives an estimated 40,000 medical calls annually

Bundled TCPR Intervention

Telecommunicator Training
Protocol Change
Continuous Quality Improvement (CQI)
TCPR Training

- 30 minutes of video training
  - Emphasized the importance of identifying agonal respirations

- Two-hour lecture
  - AHA two-question model
  - Assertiveness

- One hour of simulation-based training
TCPR Protocol

- P1 Protocol
  - Ventilations before compressions
  - Head-tilt-chin-lift breathing assessment

- P2 Protocol
  - Implemented AHA guideline-based protocols
    - 2-Question Model
      - Is the patient conscious?
      - Is the patient breathing normally?
QI Data Collection

- **TCPR Process Metrics**
  - **Rates**
    - Telecommunicator recognition of cardiac arrest
    - TCPR instructions started
    - Telecommunicator BCPR initiated
  - **Times**
    - Telecommunicator recognition of cardiac arrest
    - **Start** of instructions
    - First bystander chest compression
QI Feedback

AHA Guidelines
Circulation 2010
Results
Study Group

Total Calls Reviewed
N = 1,698

Excluded Total
N = 916
- Barriers N = 293
- CPR in progress N = 281
- CPR not indicated N = 271
- Patient’s status changed N = 71

CPR Indicated
N = 782

P1
N = 233

P2
N = 549
TCPR Process Rates P1 vs. P2

* Indicates p<0.001

- Cardiac Arrest Recognized: P1 80%, P2 95%
- TCPR Instructions Started: P1 32%, P2 72%
- Bystander TCPR Initiated: P1 18%, P2 70%

* Indicates p<0.001
TCPR Process Times P1 vs. P2

* Indicates p<0.001

MEDIAN TIME (SECONDS)

Dispatcher Recognized Cardiac Arrest
TCPR Instructions Started
First Chest Compression

P1
P2

74
71
176
133
265
162

* Indicates p<0.001
Discussion

- Intervention required no new infrastructure

- Significant increase in Telecommunicator CPR and decrease in time to first chest compression

- Perhaps:
  - Increased dispatcher assertiveness
  - AHA 2-question model protocol
  - Training for the detection of agonal respirations
  - Continuous quality improvement
Limitations

- Observational study

- Calls of suspected cardiac arrest are complex and require a certain degree of personal judgment during the evaluation process

- Using the search term “code” is an imperfect method for identifying all calls of cardiac arrest

- Findings may not be observed equally across centers
Conclusion

- The bundled training, guideline-based protocol, and continuous quality improvement program was associated with significant improvements in Telecommunicator CPR process metrics.
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