A Change in Scene-ery: Re-Thinking On-Site Management of Cardiac Arrest?

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Chest Compression Fraction Determines Survival in Patients With Out-of-Hospital Ventricular Fibrillation

Jim Christenson, MD; Douglas Andrusiek, MSc; Siobhan Everson-Stewart, MS; Peter Kudenchuk, MD; David Hostler, PhD; Judy Powell, BSN; Clifton W. Callaway, MD, PhD; Dan Bishop; Christian Vaillancourt, MD, MSc; Dan Davis, MD; Tom P. Aufderheide, MD; Ahamed Idris, MD; John A. Stouffer; Ian Stiell, MD, MSc; Robert Berg, MD; and the Resuscitation Outcomes Consortium Investigators
ROC: Adjusted Odds Ratio of Survival

Adjusted OR

<table>
<thead>
<tr>
<th>CPR Fraction</th>
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<tr>
<td>0-20</td>
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<tr>
<td>21-40</td>
<td>2.13</td>
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<tr>
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<tr>
<td>61-80</td>
<td>2.88</td>
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<tr>
<td>81-100</td>
<td>3.3</td>
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Adjusted for: bystander CPR, age, gender, time from 911 call to arrive at scene, chest compression rate, public location
Believe in the Fundamentals

• Its about compressions
  – High quality
  – Limited interruption
• Defibrillation
• Controlled ventilation
• Everything else is secondary
“The Most Powerful Predictor by far of survival to hospital discharge is return of spontaneous circulation in the field”

Kellerman A. Annals Emerg Med 2010;56:358-61
CPR Under the Old Oak Tree: Where Do You Resuscitate YOUR Cardiac Arrest?

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Last year at Eagles...
Under the Oak Tree Take Away

• Focus on the things that matter and work your cardiac arrest where they drop....

• Do not move them until you resuscitate them or decide they are dead....

• Some may benefit from transport to cath lab with compression device in place.
Portland paramedics have nearly tripled their success rate in the past year of saving patients who have suffered cardiac arrest, in large part by providing emergency services on the scene and avoiding time-consuming ambulance rides to local hospitals.
NEWS & PERSPECTIVE

ROSC or Death

Some EMS Systems Stop Transporting Cardiac Arrest Patients, Perform CPR at Scene, Roadside, Ambulance Bay

by JOANNE KENEN
Special Contributor to Annals News & Perspective

The patient was alert and talking as they arrived in the emergency room, but also in other hospitals in the larger community. And it led to an expanding appreciation that with out-of-hospital cardiac arrest seconds—not minutes, but seconds—count. It’s not about on whose turf the patient’s heart stopped but about how to improve the dismal on the patient, and their outcome based on what we know in the science,” Dr. Hinchey later said in a follow-up e-mail. “EMS can never replace emergency department care, only supplement it. If done well, everyone benefits, most importantly our patients.”

Clifton W. Callaway, MD, PhD, Associate Professor, vice chair of the Department of Emergency Medicine, University of Pittsburgh, served on the advanced cardiac life support subcommittee when the American Heart Association updated its resuscitation guidelines. Dr. Callaway, who describes himself as “aggressive” when it comes to improving emergency care, said it was a dismal
A few questions for YOU?

• How many are using a choreographed CPR procedure?
• How many work cardiac arrest on scene?
  – Is there a time limit?
• How many would stop the truck to do CPR?
• How many would do CPR in the parking lot?
How many of you know the quality of your CPR?
Person in Position 1 (P1) always on patients Right side
1. Initial patient assessment
2. Initiates 100 compressions
3. Ventilates in off cycle
4. BIAD Preparation in off cycle

Person in Position 2 (P2) always on patients Left side
1. Brings and operates AED
2. Alternates 100 compressions with P1
3. Ventilates in off cycle
4. Turns on AED after 200 Compressions
5. Assist with BIAD Preparation if needed

Person in Position 3 (P3) always at patients Head
1. Opens/clears Airway and insert OPA
2. Assembles/apply BVM and ITD
3. Provides 2 hand mask seal
3. Inserts/secures BIAD (King) & ITD & ETCO₂ after 400 Compressions

Person in Position 4 (P4) always just outside the “Triangle” of CPR
1. Team Leader Duties
2. May assist with BIAD preparation and securing if needed

Advanced Provider in Position 5 (P5) always at an extremity outside the CPR “Triangle”
1. Initiates IV/IO access
2. Administers Medications requested by “Code Commander”

Advanced Provider in Position 6 (P6) always at an area outside the CPR “Triangle” near a lower leg and Operates the Monitor
1. Code Commander
2. Communicates/Interfaces with Team Leader
3. Makes all Patient treatment decisions
Performance Improvement

Education & Training

Process or Engineering Control

Implement the Plan

Check Results / Analyze Data

Act on the findings

Plan an improvement / change

Clinical Performance Indicators

Clinical Event Reviews

Clinical Audits
If we are going to be the experts in cardiac arrest resuscitation we should be looking to see that we truly are.
Provider Feedback

• People will do what you measure...
• Only if you tell them the results
• Measure the things that matter and give feedback that:
  – Has clear goals
  – Is consistent
  – Is timely
Eagles Responses

• Do you regularly provide feedback to your EMT/Paramedics about cardiac arrest care?
  15-YES  9-OCCASIONAL  8-NO
  If yes, is your process standardized?
    7-YES
  If yes, what mechanism is used to provide feedback?
    6-Email  8-In-Person  3-Report

• n=32
Eagles Responses

• Do you provide “real time” or “immediate post-arrest” feedback to your crews on CPR quality?

  8-YES  2-SOON  3-SOME  19-NO

• Do you/your agency have a regular recognition practice to celebrate cardiac arrest successes and survivors?

  16-YES  5-SOME  11-NO
Tailboard Post Event

• Advantages:
  – Gives immediate feedback
  – Interactive/Promotes additional discussion
  – Builds team relationship

• Disadvantages
  – Requires immediate access to data
  – Holds units out of service
  – Must be able to bring providers together
Cardiac Arrest
CPR Performance
Compression Quality Page

The first page will contain:

- Shock Summary (This indicates each shock delivered during the use of one monitor)
- 3 Compression Quality indicators
  - Depth
  - Compression Quality
  - Rate (cpm)
Compression Quality Page Continued

- The green bar is target depth zone and is set at 2.0”-3.0”
- Each blue line indicates a compression

The green bar is target rate zone and is set at 100-110 cpm
CPR Periods – Key Indicators

- This is the average time from the last compression to the delivery of shock.
- This is the average time it took to start the next compression.
- Our goal is to do our pulse/rhythm check/shock within 10 seconds.

This is the mean rate (per minute) at which chest compressions were performed during an uninterrupted series of chest compressions.
- Our goal is to be between 100 and 110 cpm.
CPR Periods

This number represents the proportion of resuscitation time during which chest compressions were performed.

A higher compression ratio signifies an adequate rate and minimal pause during resuscitation. Remember high chest compression fraction is independently associated with better chances of survival.
CPR Period - Rate

Rate (target zone from 100 to 110 CPM):

- Standard deviation: 13.59 cpm
- Above target zone: 53 (1.31 %)
- In target zone: 3737 (92.52 %)
- Below target zone: 249 (6.16 %)

Rate:
- In target zone - number of compressions performed within 100 and 110 cpm
CPR Period Depth

Depth –
• In target Zone – is the total number of compressions performed between 2 and 3 inches

Depth (target zone from 2 to 3 in):

- Standard deviation: 0.42 in
- Above target zone: 0
- In target zone: **449** (11.12 %)
- Below target zone: 3390 (88.88 %)
Self-Assessment

Ask yourself the following:

• Was each pause period under 10 seconds?
• Was CPR started immediately after the shock/pulse check?
• Was the monitor charged before each check?
• Was the monitor in paddles during CPR?
• Were effective compressions performed?
“No matter how beautiful the strategy you occasionally have to look at the results”

-Winston Churchill
### 2013 ATCEMS CPR Compression Fraction (Median)

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<th>W/ Mechanical</th>
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**Legend:**
- Manual
- W/ Mechanical
Work ‘em where they drop?

• We have an engineered process
  – Checklists, metronomes, choreographed CPR
• We have good understanding of what is important in cardiac arrest
• YES!! Work them where they drop!!!
But....

• We need to measure our performance
• We need to work to refine our process
• Provide feedback to our providers to promote desired behaviors
• Next step is to engage hospital partners
  – Admission rates
  – Completion of resuscitation bundle
  – Discharge status and rates
More on Pit Crew at: atcomdce.org

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