

# CPR Under the Old Oak Tree: Where Do You Resuscitate YOUR Cardiac Arrest?

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# Objectives

- Describe priorities of cardiac arrest management
- Embrace working OOHCA where they drop!
- Describe why there may be patients where this isn't true
- How do we figure out who they are and what do we do with them?

# Case # 1

- 12:29 arrived on scene
- Unknown Past Medical History but takes:
  - Sertraline
  - Carvedilol
  - Simvastatin
  - Lasix
  - Potassium
- HPI from friend who states 67 YOM who came over for breakfast having no complaints and a normal day.....

A normal day where he.....

....shot up with methamphetamine  
approximately 1 hr ago then...

”he just slumped over and became  
unresponsive.”

# On arrival...

- FR CPR in progress
  - 1 defib PTA then no-shock indicated
- CPR continued
  - Vtach shock delivered
  - BVM ventilations with ITD and binky light
  - IO's established
- And it is ON

- **12:31 shock**
- 12:34 amio
- 12:35 epi
- **12:35 shock**
- 12:36 d-stick 128
- **12:37 shock**
- 12:38 epi
- 12:39 bicarb
- **12:39 shock**
- 12:40 fluids run wide
- **12:41 shock**
- **12:44 shock**
- 12:45 epi
- **12:46 shock**
- **12:48 shock**
- **12:50 shock**
- 12:51 epi
- **12:52 shock**
- **12:55 shock**
- 12:56 calcium
- 12:57 epi
- **12:59 shock**
- 13:01 magnesium
- **13:02 DSED**
- 13:04 ROSC
- 13:05 TH
- 13:06 12 lead NO STEMI
- 13:07 dopamine
- 13:14 versed
- 13:19 Vecuronium
- 13:20 transport initiated

# Oh but its not over....

- 13:22 patient re-arrests enroute
  - Crew pulls over to perform CPR
  - Feels CPR not adequate in confines of ambulance
  - Move out of ambulance to do better CPR
  - But it's really hot so they move under shade tree and....

## So what do they do?

# Oh but its not over....

- 13:22 patient re-arrests enroute
  - Crew pulls over to perform CPR
  - Feels CPR is not adequate CPR in confines of ambulance
  - Move out of ambulance under shade tree and....
- 13:24 shock
- 13:28 epi
- 13:29 ROSC
- 13:34 reloaded and transport initiated
- 13:35 12-lead NO STEMI



# Outcome

- 14 shocks including 1 DSED
- 7 epi
- Amio x2, bicarb, calcium, mag, dopamine
- IH, versed, vec
- Pt d/c to home per CARES data
- No CPC data available

“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

# Believe in the Fundamentals

- Its about compressions
  - High quality
  - Limited interruption
- Defibrillation
- Controlled ventilation
- Everything else is secondary



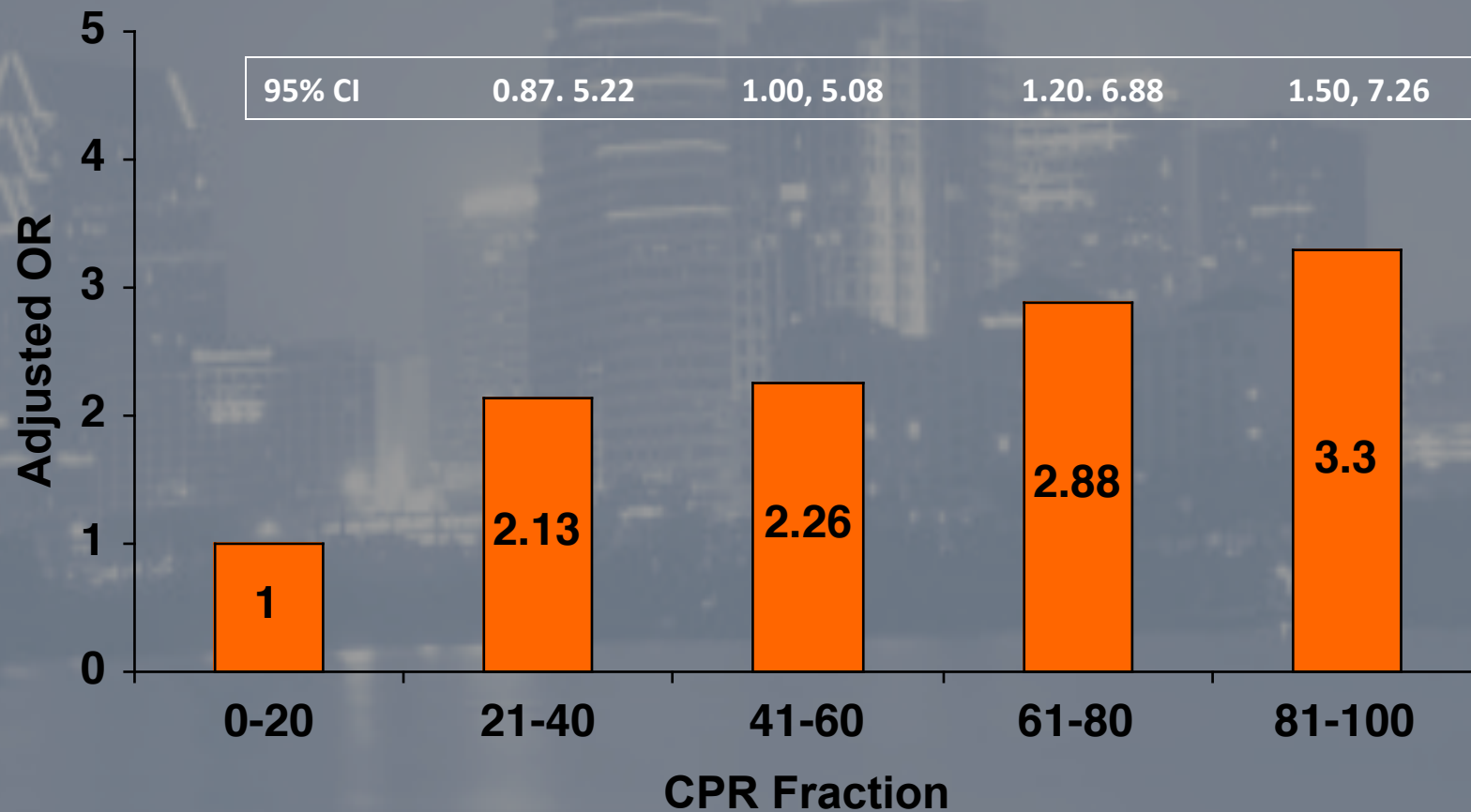
## Resuscitation Science

# 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

Christenson et al. Circulation 2009

# ROC: Adjusted Odds Ratio of Survival



Adjusted for: bystander CPR, age, gender, time from 911 call to arrive at scene, chest compression rate, public location

Good CPR is important

You can't do good CPR while moving

Be aggressive and don't move

# BANGOR DAILY NEWS

## Portland paramedics skip the ambulance rides, save three times as many lives

By  
Pos  
PO  
pat  
avo

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.

Now to a case that made us begin to consider a whole new element of OOHCA management....



## Case # 2

- 16:48 Arrived to find 39 YOF in CA with FR performing mechanical CPR with King LT
- Hx HTN taking metoprolol
- Per husband pt had been complaining of “indigestion” for hours
  - suddenly complained of shortness of breath and collapsed.
  - Husband provided bystander CPR until FR arrival.

# I'll spare you the details....

- Initial rhythm v-fib
- 3 shocks by FR
- 4 additional by EMS
- 3 epi and Amio
- 17:11 ROSC(23 min)
- Began post resuscitation care
- 2 min later re-arrest
- 2 additional shocks progressing to PEA
- Continued resuscitation with 6 additional epi and bicarb
- 17:51 Transport initiated with mechanical compression device (63 min)

A blurred, dark image of a city skyline at night, with lights reflecting on water in the foreground. The text "So why did they initiate transport?" is overlaid in white.

So why did they initiate transport?

“...throughout cardiac arrest patient has intermittent spontaneous respiration, eye opening and movement of arms....”

# At the ED....

- Pt remained in PEA but continued to move, open eyes, breathe so...efforts continued
- Cardiologist called and took to cath lab at approximately 19:00 hrs(132min); found and opened proximal LAD occlusion with good perfusion
- Unable to maintain adequate pressure despite IABP...pt expired.

Was this an inevitable outcome or was the intervention too late and the total ischemic time too long for salvage....

## Continuous Mechanical Chest Compressions During Cardiac Arrest to Facilitate Restoration of Coronary Circulation With Percutaneous Coronary Intervention

- 53yom ems witnessed arrest
- Brief ROSC with STEMI
- Taken to lab with prox LAD occlusion at 110 min into arrest
- Revascularized but no pump function confirmed by echo
- Expired
- 53yof with 2 vessel ds with intervention
- V-fib arrest after cath
- Placed compression device and returned to lab at 10 min
- Confirmed poor perfusion additional intervention
- D/C neuro intact

Grogard . Editorial in Jrnl of Amer Coll Card; 2007

# Cardiac arrest in the catheterisation laboratory: A 5-year experience of using mechanical chest compressions to facilitate PCI during prolonged resuscitation efforts<sup>☆</sup>

Henrik Wagner<sup>a</sup>, Christian J. Terkelsen<sup>b</sup>, Hans Friberg<sup>c</sup>, Jan Harnek<sup>a</sup>, Karl Kern<sup>d</sup>, Jens Flensted Lassen<sup>b</sup>, Goran K. Olivecrona<sup>a,\*</sup>

- 43 pt (33 STEMI, 7 NSTEMI, 2 elective, 1 PCT)
- 5 had myocardial rupture - all died
- 36 treated with PCI
- 11 d/c alive in good neuro condition
- Conclusion: MC in cath lab allows PCI despite CA with sustained circulation. It is unlikely any of these pt would have survived without the use of MC during catheterization.



# Back to the Drawing Board

- Perhaps staying on scene is not the best approach for ALL cardiac arrests but:
  - Who should we take to the lab?
  - How long should we work them on scene?
  - How do we provide adequate perfusion during transport?
- How do we convince cardiology to take these patients to the cath lab in arrest

# Potential Criteria?????

- Witnessed cardiac arrest
- Bystander CPR
- Mechanical CPR Device

- AND -

# Potential Criteria?????

- Good story for ischemia prior to collapse?
- Refractory V-fib/Vtach after:
  - 20 minutes-or-
  - Complete dose of antiarrhythmics-or-
  - DSED?
- PEA/Brief ROSC with evidence of STEMI?

# This is NOT for EVERY Arrest

- Have limited number of cardiologists willing to go to cath lab
- I believe the current philosophy is right based on NOBODY going to the cath lab but...
- It risks prolonged ischemic times and likely creates self fulfilling prophecy of poor outcomes when we DO go to the lab

# Take Away

- Cardiac arrest should STILL be worked where they drop, but...
- The quality of prehospital resuscitation has prompted new questions.
- We need to work with the cardiologists to study which patients would benefit from the lab and develop a process to get them there

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