The 2015 BLS & ACLS Guidelines... What Does the Future Hold?

Emergency Nurses Association  Orlando, FL

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Objectives

1. Discuss the proposed 2015 BLS & ACLS Guidelines
2. Describe the literature supporting the guidelines
3. Discuss the 3 ongoing studies that will not be included in the guidelines
2010 ACLS Guidelines

- Bigger emphasis on compressions
  - “Push fast, push hard”
- Early defibrillation
- Waveform Capnography
  - Quality of compressions
- Post resuscitation algorithm
  - Temperature management
2010 AHA ACLS Guidelines

Coming October 15, 2015...

New BLS & ACLS Guidelines!!!
2015 ACLS/BLS Guidelines Draft: www.ilcor.org
CPR Quality
Quality of compressions

Current AHA recommendations:

- Rate = at LEAST 100/min
- Depth 2 inches (50 mm)
- Allow for full recoil of the chest

Compressions provide 25-33% of normal cardiac output
Optimal Rate?

• ROC PRIMED Study
• Prospective observational study
• OHCA
• After adjusting for
  ▫ chest compression fraction &
  ▫ depth

highest survival to discharge was found when the rate was...

100 – 119 per minute!

Compression rate
“Push fast, push hard”

Too Slow  
(Before 2010)

100 – 120 /min

Too Fast  
(current)
Optimal chest compression depth?

ROC PRIMED Trial

- Out of hospital cardiac arrest
- Current depth recommendation is 50 mm
- 2005 rec. 38 – 50 mm
- No upper limit
- Highest survival depth interval of 40.3 mm – 55.3 mm
- Peak survival 45.6 mm (~1.8 inches)

Compression Fraction

• The amount of time spent providing compressions
• May also be called “compression ratio”

• Goal: At least 80%!

Is it acceptable to be off the chest for 20% of an arrest?
Smoothing Spline of Survival on CCF

Positioning

Leaning & recoil
CCC Trial

- ROC Study group
- OHCA, survival to discharge

- Continuous 2 minutes of compressions without pauses in compressions for breathing
- Chest compressions with pauses for breathing

- Plan to enroll 23,600 patients in 8 regions across the US & Canada
Mechanical Chest Compression Devices

• Provides effective, consistent and uninterrupted compressions during:
  ▫ Intra-departmental transport
  ▫ Defibrillation
  ▫ Advanced procedures
AVOID Over-ventilation!!!

• If patient does not have an advanced airway:
  
  30:2

  Do you stop compressions for ventilations? **YES**

• If the patient has an advanced airway:
  
  **10 breaths / min**

  (1 breath every 6 seconds)

  Do you stop compressions for ventilations? **NO**

-2015 proposed BLS/ACLS Guidelines
Defibrillation
Ventricular fibrillation

- Most successful treatment for v-fib is defibrillation!
- For every minute delay, survival decreases by 10%!!!

Effect of Early Defibrillation and Bystander CPR on Survival after Witnessed SCA from VF

No Bystander CPR (N=5862)  Bystander CPR (N=6231)

Survival with CPC 1-2 (%)

Time from Collapse to First Defibrillation (min)


N = 13, 053
Effects of compression depth and pre-shock pauses predict defibrillation failure during cardiac arrest

Dana P. Edelson, Benjamin S. Abella, Jo Kramer-Johansen, Lars Wik, Helge Myklebust, Anne M. Barry, Raina M. Merchant, Terry L. Vanden Hoek, Petter A. Steen, Lance B. Becker

The 2nd most cited paper in Resuscitation in the 5-year period after it was published!

Conclusion: Pause duration does affect VF termination rate.
Minimize Pre & Post Shock pauses

Pre-Shock pause < 3 seconds

Sell et al 2010 Resuscitation

Post-Shock pause < 6 seconds
Compress 100 – 120 bpm
Depth 4.5 – 5.5 cm, max 6 cm (1.8 to 2.2 inches)
Avoid chest wall leaning, allow for full recoil
Suggest against the use of artifact-filtering algorithms for analysis of ECG rhythm during CPR
Ventilation rate 10 breaths per minute
Suggest an initial period of CPR for 30-60 seconds while the defibrillator is being applied
For manual defibrillators, we suggest that pre-shock pauses are ≤10 seconds
We suggest that CCF should be >60%
2015 ACLS/BLS Guideline *DRAFT* Recommendations:

- recommend **against** routine use of Impedance Threshold Devices (ITD) in addition to standard CPR or active Compression-Decompression CPR

- Suggest mechanical chest compression devices should not be considered the standard of care for cardiac arrest patients, but can be considered a reasonable alternative to high quality manual chest compressions in some settings (weak recommendation, moderate quality of evidence).
Drugs
Which of the following medications has been shown to increase survival to discharge from cardiac arrest?

A. Epinephrine
B. Vasopressin
C. Bicarb
D. Amiodorone
E. None of the above
Emergency medications - V-fib

- **Epinephrine** 1 mg every 3-5 min **or**
- **Vasopressin** 40 units instead of the 1\textsuperscript{st} or 2\textsuperscript{nd} Epi
- **Amiodarone**
  - 300 mg IV pulseless
  - 150 mg pulse

Circulation 2010, AHA ACLS Guidelines
Studies questioning the use, timing, efficacy of Epinephrine

- Dumas et al (2014) J Amer College of Card
- Olasveengen et al (2009) JAMA
- Paradis et al (1991) JAMA

*Epi associated with worse outcomes
VSE Study  Mentzelopoulos (2013) JAMA

- RCT
- **Vasopressin 20 IU + Epi 1mg q 3 min x 5 cycles** + **40 mg Steroid - methylprednisolone (1st cycle)**

Figure 2. Results on Survival Analysis
Amiodorone vs. Placebo
(after 3 successive shocks in OHCA)

N = 504

Kudenchuk et al (1999) NEJM
ALP Trial

• **Amiodorone** vs.
• **Lidocaine** vs.
• **Placebo**

• Out of hospital v-fib arrest

• Goal is drug administration < 10 minutes after arrival on scene

• Resuscitation Outcome Consortium (ROC) study group

• Multi-city EMS trial

• Still enrolling patients

• Goal: 3,000 patients
Is Epinephrine beneficial or does it cause harm?

- Current recommendation: 1 mg Q 3 – 5 min

- RCT Epi vs. Placebo
- Warwick University
- UK & Wales
- Enrollment started Sept 2014
- 8,000 subjects
- Out-of-Hospital Cardiac Arrest

- Paramedic2 Trial

http://www2.warwick.ac.uk/fac/med/research/hscience/ctu/trials/critical/paramedic2/caa/
2015 ACLS/BLS Guideline *DRAFT*

**Recommendations:**

- For IHCA we suggest that the combination of methylprednisolone, vasopressin & epinephrine may be considered as an alternative to epinephrine alone during CPR

- Suggest the use of Amiodarone in adult patients who suffer OHCA with refractory VF/pVT to improve rates of ROSC

  Weak recommendation; high confidence in effect estimate

www.ilcor.org
Post Cardiac Arrest: Targeted Temperature Management
Post-Arrest Optimal Temperature?

33°C vs. 36°C

Nielsen et al (2013) NEJM
Clinical assessment:

• Does mild hypothermia (32 - 34°C) reduce mortality & improve neurologic outcomes post cardiac arrest?
  • YES!!!!

• Does 36°C have the same benefit?
  • YES!!!

• Does “normothermia” have the same benefit?
  • We don’t know!!!

• Is fever bad post-cardiac arrest?
  • YES!!!
• Recommend selecting and maintaining a constant, target temperature between 32°C and 36°C for those patients in whom temperature control is used

  strong recommendation, moderate-quality evidence

• Whether certain subpopulations of cardiac arrest patients may benefit from lower (32-34°C) or higher (36°C) temperatures remains unknown, and further research may help elucidate this.

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In conclusion,

- Resuscitation involves a system of care, all being inter-dependent on improving outcomes
- We need to focus on **high quality CPR** & early defibrillation
- Capnography & CPR feedback devices should be considered to monitor quality
- Temperature should be managed to 32 - 36° C in patients resuscitated from out-of-hospital cardiac arrest from Ventricular Fibrillation