

ACEP EAGLES
Important EMS Articles
for 2011

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Circulation 2010;122(Sup 2):s345-s421

Part 8: Advanced Life Support
2010 International Consensus on Cardiopulmonary Resuscitation and
Emergency Cardiovascular Care Science With
Treatment Recommendations

Laurie J. Morrison, Co-Chair¹; Charles D. Deakin, Co-Chair²; Peter T. Morley; Clifton W. Callaway; Richard E. Kerber; Steven L. Kronick; Eric J. Lavonas; Mark S. Link; Robert W. Neumar; Charles W. Otto; Michael Parr; Michael Shuster; Kjetil Sunde; Mary Ann Peberdy; Wanchun Tang; Terry L. Vanden Hoek; Bernd W. Böttiger; Saul Drajer; Swee Han Lim; Jerry P. Nolan; on behalf of the Advanced Life Support Chapter Collaborators

- 35 text pages
- 1,022 references

Part 8: Advanced Life Support
2010 International Consensus on Cardiopulmonary Resuscitation and
Emergency Cardiovascular Care Science With
Treatment Recommendations

Circulation 2010;122(supp2) s345-421

Major Points

- ETT
- Capnography
- Atropine
- Adenosine
- Therapeutic Hypothermia

Circulation 2010;122(supp2) s345-421

ACLS 2011 Changes

- ETT
 - No evidence to support ETT > supraglottic
 - Consider King, LMA, Combitubes
 - Especially if rigorous retraining not possible
- Capnography
 - Wave form recommended
 - Colorimetric acceptable if no wave form

USING A LARYNGEAL TUBE SUCTION-DEVICE (LTS-D) REDUCES THE "NO FLOW TIME" IN A SINGLE RESCUER MANIKIN STUDY

Christoph H. R. Wiese, MD,¹ Utz Bartels, MD,² Alexander Schultens, MD,³ Tobias Steffen, MD,¹ Andreas Torney, MD,⁴ Jan Bahr, MD,⁵ and Bernhard M. Graf, MD⁶

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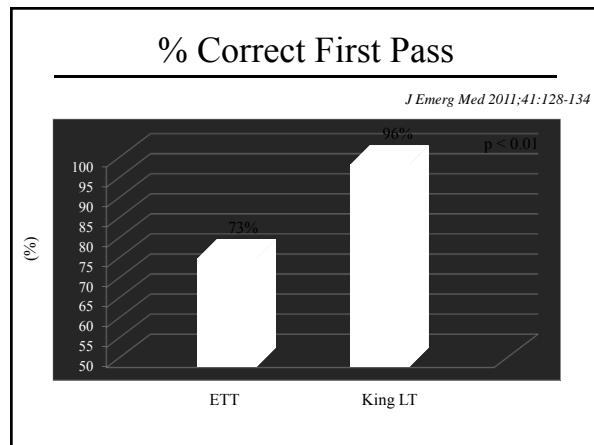
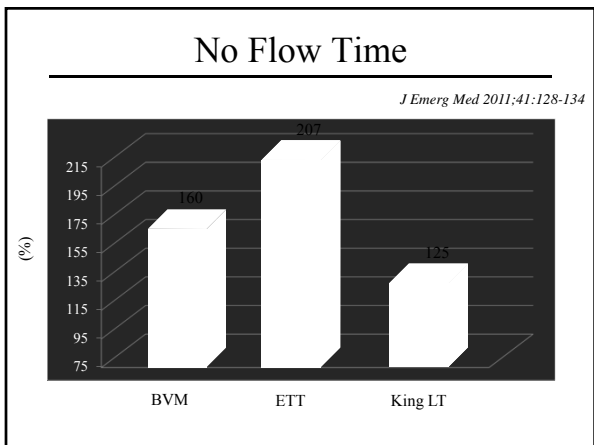
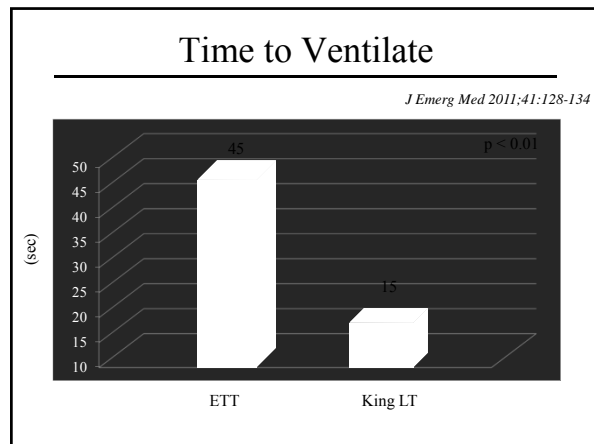
J Emerg Med 2011;41:128-134

- ETT vs. Supraglottic Laryngeal Tube (e.g. King LT). Which is faster to secure the airway?
- Does ETT result in more "no flow" time?

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J Emerg Med 2011;41:128-134

- 150 paramedics
- Randomized to BVM vs. King LT vs. ETT
- Simulated patient in VF on monitor
- Two person teams, patient requires 3 defibs
- Everything timed via computer monitoring



Supraglottic Airways Take Home

- Important Airway Adjuncts or Airways
- Easier and faster than ETT
- Have one available in ED as rescue device
- Should your personnel be intubation or using a supraglottic?

The Association Between Prehospital Endotracheal Intubation Attempts and Survival to Hospital Discharge Among Out-of-hospital Cardiac Arrest Patients
 Jonathan R. Studnek, PhD, NREMT-P, Lars Thestrup, MD, Steve Vandeventer, EMT-P, Steven R. Ward, NREMT-P, Kevin Staley, MPA, EMT-P, Lee Garvey, MD, and Tom Blackwell, MD

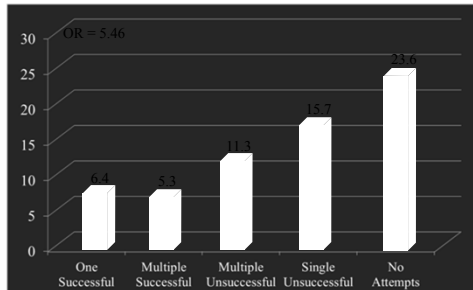
Abstract
 Objectives: The benefit of prehospital endotracheal intubation (ETI) among individuals experiencing

Acad Emerg Med 2010;918-925

- Retrospective analysis 2006 – 2009
- Successful ETT vs. Survival
- Observational Study; ROSC 26.2%
- Mecklenburg County, Carolinas Hosp, N.C.

Survival to Hospital Discharge

Acad Emerg Med 2010;918-925



The Association Between Prehospital Endotracheal Intubation Attempts and Survival to Hospital Discharge Among Out-of-hospital Cardiac Arrest Patients

Acad Emerg Med 2010;918-925

Results

- No attempt at ETI increases ROSC by a factor of 2.33
- No attempt at ETI increases Survival to discharge by a factor of 5.46

Take Homes Prehospital ETI

- ETI may not improve survival
- May interrupt compressions
- May cause hyperventilation +/- or hypoxia
- Do we need to stop ETI and use supraglottics?
- *Or change how we do ETI?*

ACLS 2011 Changes

Circulation 2010;122(supp2) s345-421

- Atropine
 - No longer recommended for AS or PEA
- Adenosine
 - Can be used in regular monomorphic WCT
 - May be useful for PSVT vs. VT

Atropine Sulfate for Patients With Out-of-Hospital Cardiac Arrest due to Asystole and Pulseless Electrical Activity

The Survey of Survivors After Out-of-hospital Cardiac Arrest in KANTO Area, Japan (SOS-KANTO) Study Group

Background: The 2005 guidelines for cardiopulmonary resuscitation (CPR) have recommended that administration of atropine can be considered for non-shockable rhythm, but there are insufficient data in humans.

Circ J 2011;75:580-588

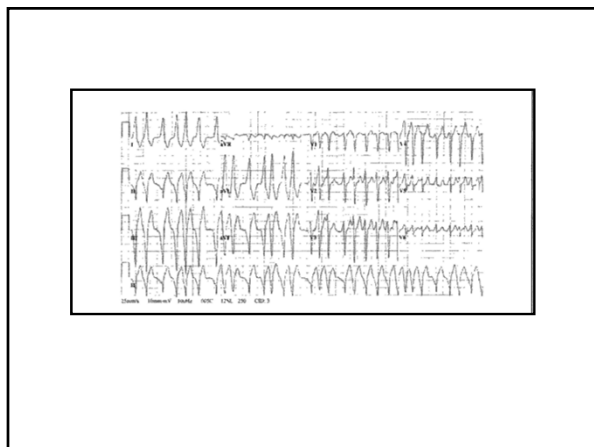
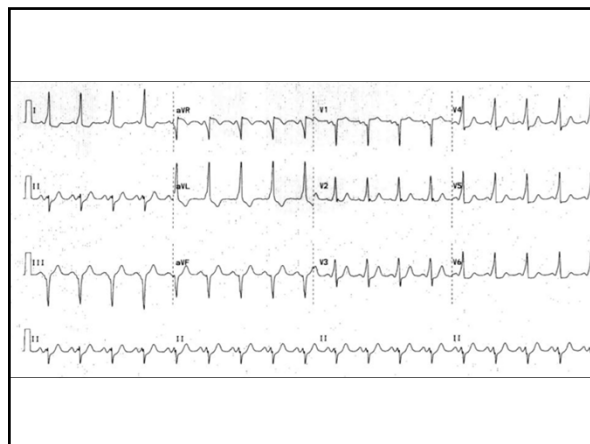
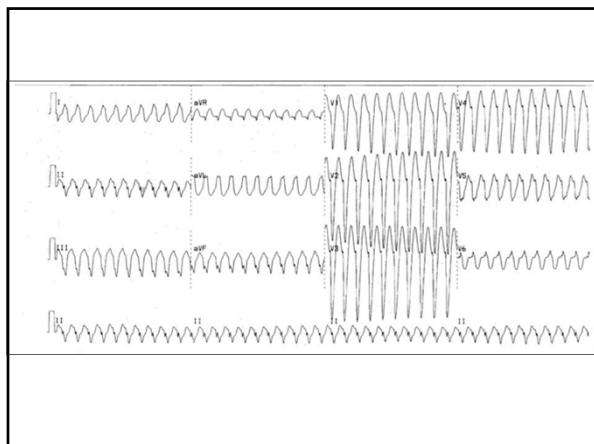
- 7,448 AS and PEA arrest pts
- Epi + Atropine vs. Epi alone Q 3 min
- Atropine use increased ROC in AS
- **Atropine of no long term benefit in AS**
- **Atropine decreased long term PEA survival 3.2% vs. 7.1% (1.02% vs 0.59%)**

Adenosine in WCT

Circulation 2010;122(supp2) s345-s421

In undifferentiated regular stable wide-complex tachycardia, IV adenosine:

- may be considered relatively safe
- may convert the rhythm to sinus
- may help diagnose the underlying rhythm.



Circulation 2010;122(supp2) s345-421

Adenosine Mortality

- Sinus Tachycardia
 - Elderly, dehydrated, fever, pneumonia

- Wide and Irregular
 - WPW with aberrancy

Hypothermia

Current ACLS Recommendations

Circulation 2010;122(supp2) s345-s421

“Comatose adult patients (not responding in a meaningful way to verbal commands) with spontaneous circulation after an out-of-hospital VF cardiac arrest should be cooled to 32-34° C for 12 to 24 hrs.”

Improved Out-of-Hospital Cardiac Arrest Survival After the Sequential Implementation of 2005 AHA Guidelines for Compressions, Ventilations, and Induced Hypothermia: The Wake County Experience

Paul R. Hinchey, MD, MBA, J. Brent Myers, MD, MPH, Ryan Lewis, MS, EMT-P, Valerie J. De Maio, MD, MSc, Eric Royer, MSN, ACNP

Ann Emerg Med 2010;56:348-357

- Witnessed VT/VF Survival increased from 13.8% to 40.8%
- Therapeutic Hypothermia is a major factor in improvement

PCI Post Arrest

Circulation 2010;122(suppl2) s345-421

“Limited available evidence suggests that PCI during therapeutic hypothermia is feasible and may be associated with improved outcome.”

2011-2012 Management of VF/VT Survivors

S/P VF/VT awake → PCI

S/P VF/VT coma → PCI + TH

BCLS

2011 and 2012



Lancet 2011;377:276-277

Standard cardiopulmonary resuscitation versus active compression-decompression cardiopulmonary resuscitation with augmentation of negative intrathoracic pressure for out-of-hospital cardiac arrest: a randomised trial

Tom P Aufderheide, Ralph J Frascaone, Marvin A Wayne, Brian D Mahoney, Robert A Swao, Robert M Domeier, Michael L Olinger, Richard G Holcomb, David E Tupper, Demetris Yannopoulos, Keith G Lurie

Lancet 2011;377:301-311

- CPR vs. Comp-Decomp CPR and ITD
- 46 EMS Agencies
- 1,653 pts Randomized
- Survival and Neuro Status Evaluated

Standard cardiopulmonary resuscitation versus active compression-decompression cardiopulmonary resuscitation with augmentation of negative intrathoracic pressure for out-of-hospital cardiac arrest: a randomised trial

Lancet 2011;377:301-311

- Used metronome at 80/min
- Hand held suction device
- ITD attached to mask
- Mask replaced by ETI or King
- 70% ETI; 20% King

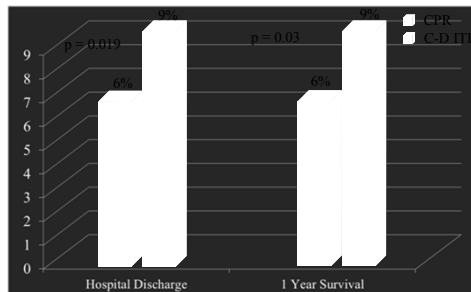
Standard cardiopulmonary resuscitation versus active compression-decompression cardiopulmonary resuscitation with augmentation of negative intrathoracic pressure for out-of-hospital cardiac arrest: a randomised trial

Lancet 2011;377:301-311

- Compression – Decompression CPR
 - ↑ venous return
 - ↑ cardiac output
 - ↑ heart and brain perfusion
- Impedance Threshold Device
 - ↓ hyperventilation
 - ↓ lung volumes
 - ↑ venous return

Survival with Good Neurologic Outcome

Lancet 2011;377:301-311



Compression – Decompression CPR Take Homes

Lancet 2011;377:301-311

- Small study, but 53% improved survival with both C-D and ITD combined
- Unclear if intubation necessary
- Exciting but needs big trial with multiple arms

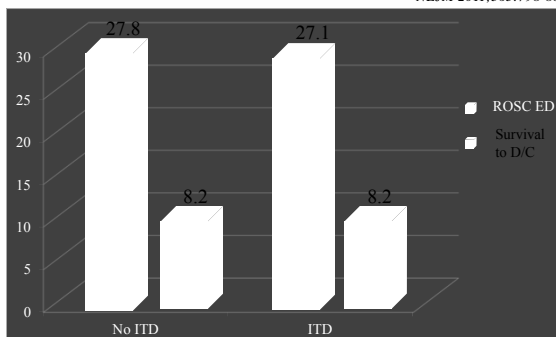
A Trial of an Impedance Threshold Device in Out-of-Hospital Cardiac Arrest

Tom P. Aufderheide, M.D., Graham Nichol, M.D., Thomas D. Rea, M.D., Siobhan P. Brown, Ph.D., Brian G. Leroux, Ph.D., Paul E. Pepe, M.D., Peter J. Kudenchuk, M.D., Jim Christenson, M.D., Mohamad R. Daya, M.D., Paul Dorian, M.D., Clifton W. Callaway, M.D., Ph.D., Ahmed H. Idris, M.D., Douglas Andrusiek, M.Sc., Shannon W. Stephens, E.M.T.-P., David Hostler, Ph.D., Daniel P. Davis, M.D., James V. Dunford, M.D., Ronald G. Pirralo, M.D., M.H.S.A., Ian G. Stiell, M.D.

- National ROC study, 8,718 pts *NEJM 2011;365:798-806*
- Can ↓ negative intrathoracic pressure result in ↑ cardiac output and survival?
- Can we improve survival with an ITD?
- 4,345 patients
- Survival, ROSC, survival to admissions

ITD

NEJM 2011;365:798-806



ITD Take Homes

- At the present time there is no convincing evidence of ITD efficacy.
- Some question how well study parameters were followed, such as delayed ITD use.
- Many feel ITDs work.
- Unless doing compression – decompression CPR, it's hard to justify ITD expense.

Early versus Later Rhythm Analysis in Patients with Out-of-Hospital Cardiac Arrest

Ian G. Stiell, M.D., Graham Nichol, M.D., M.P.H., Brian G. Leroux, Ph.D., Thomas D. Rea, M.D., M.P.H., Joseph P. Ornato, M.D., Judy Powell, B.S.N., James Christenson, M.D., Clifton W. Callaway, M.D., Ph.D., Peter J. Kudenchuk, M.D., Tom P. Aufderheide, M.D., Ahamed H. Idris, M.D., Mohamad R. Daya, M.D., Henry E. Wang, M.D., Laurie J. Morrison, M.D., Daniel Davis, M.D., Douglas Andrusiek, M.Sc., Shannon Stephens, E.M.T.-P., Sheldon Cheskes, M.D., Robert H. Schmicker, M.S., Ray Fowler, M.D., Christian Vaillancourt, M.D., David Hostler, Ph.D., E.M.T.-P., Dana Zive, M.P.H., Ronald G. Pirralo, M.D., M.H.S.A., Gary M. Vilke, M.D., George Sopko, M.D., and Myron Weisfeldt, M.D., for the ROC Investigators*

ABSTRACT

NEJM 2011;365:787-797

- Is 3 min of CPR in VF beneficial?

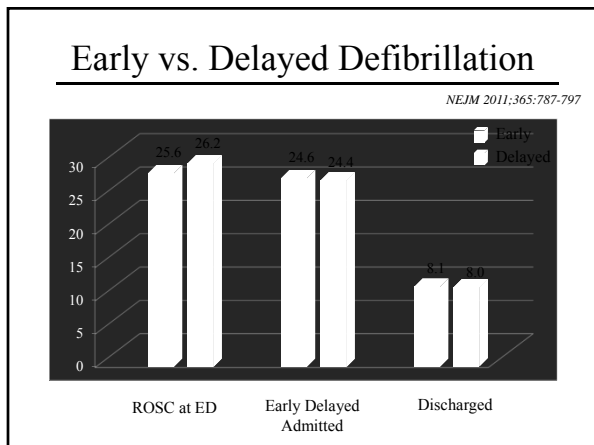
Does VFib = Shock?
Or
Does VFib = Witnessed?

Early versus Later Rhythm Analysis in Patients with Out-of-Hospital Cardiac Arrest

Ian G. Stiell, M.D., Graham Nichol, M.D., M.P.H., Brian G. Leroux, Ph.D., Thomas D. Rea, M.D., M.P.H., Joseph P. Ornato, M.D., Judy Powell, B.S.N., James Christenson, M.D., Clifton W. Callaway, M.D., Ph.D., Peter J. Kudenchuk, M.D., Tom P. Aufderheide, M.D., Ahamed H. Idris, M.D., Mohamad R. Daya, M.D.,

NEJM 2011;365:787-797

- 9,933 patients; 150 EMS agencies
- Average 42 sec to ECG analysis vs 180 sec
- 5,290 pts early analysis vs. 4,643 later analysis
- Approximately 40% had bystander CPR
- 1:4 arrests were VF/VT (1,279 vs. 1,153)



Immediate vs. Delayed Defibrillation Take Homes

- No benefits to delaying shock if brief arrest +/- bystander.
- No definitive study exists on prolonged down times and optimal care.
- Probably simplest is best.
- VF = Shock
- High quality compressions until pads on.

Take Homes on CPR

- Pump more, ventilate less, ↓ interruptions
- ACLS medications increasingly questioned
- Atropine gone from AS and PEA
- Therapeutic hypothermia is standard of care, may not work for AS/PEA
- Compression Decompression?

In Summary

- Atropine Out
- Supraglottics In
- Adenosine Back
- Hypothermia and PCI - Yes
- ITD – Not so much

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