The 5 Most Important EMS Articles EAGLES 2014

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Vanderbilt University Medical Center
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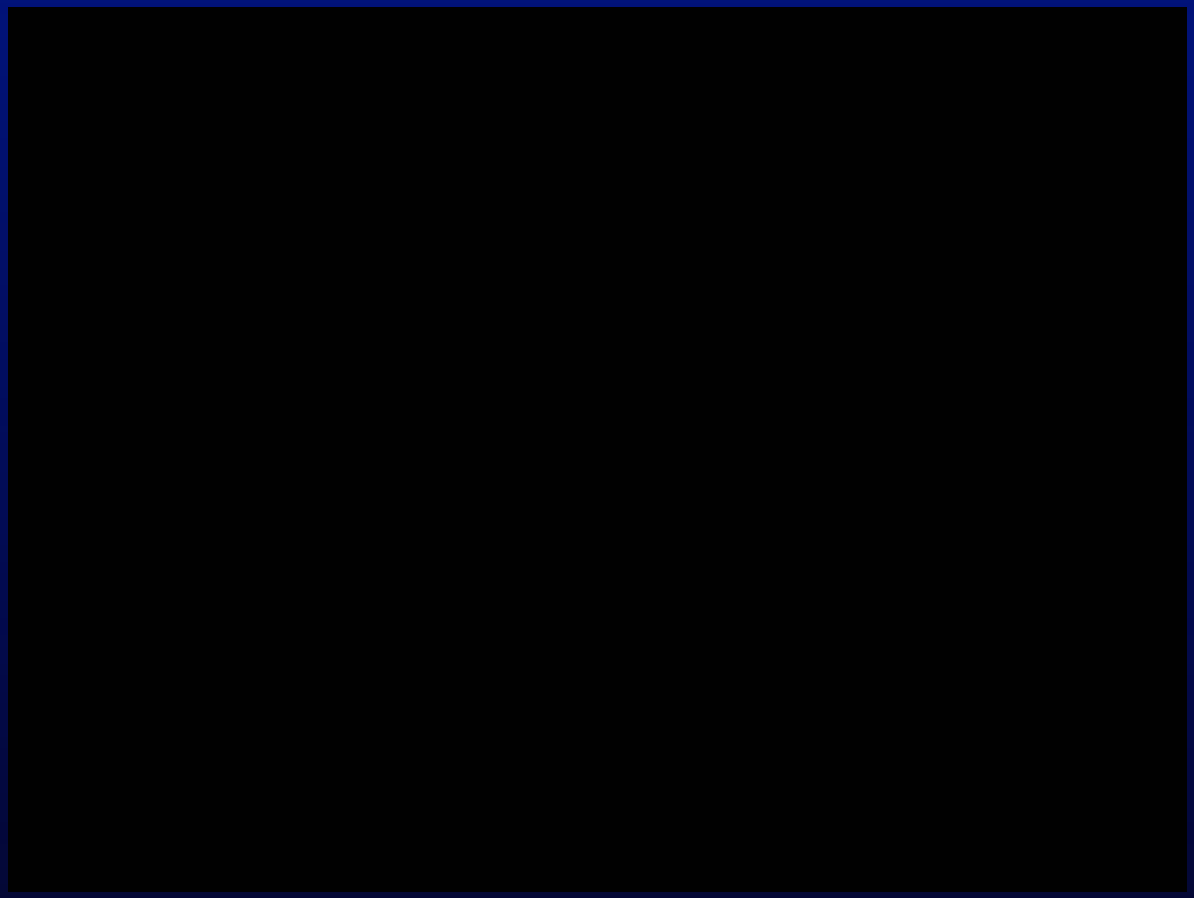

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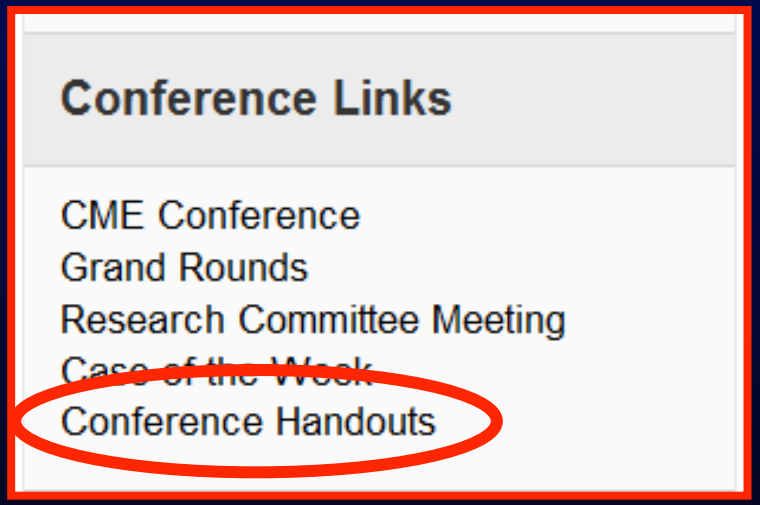

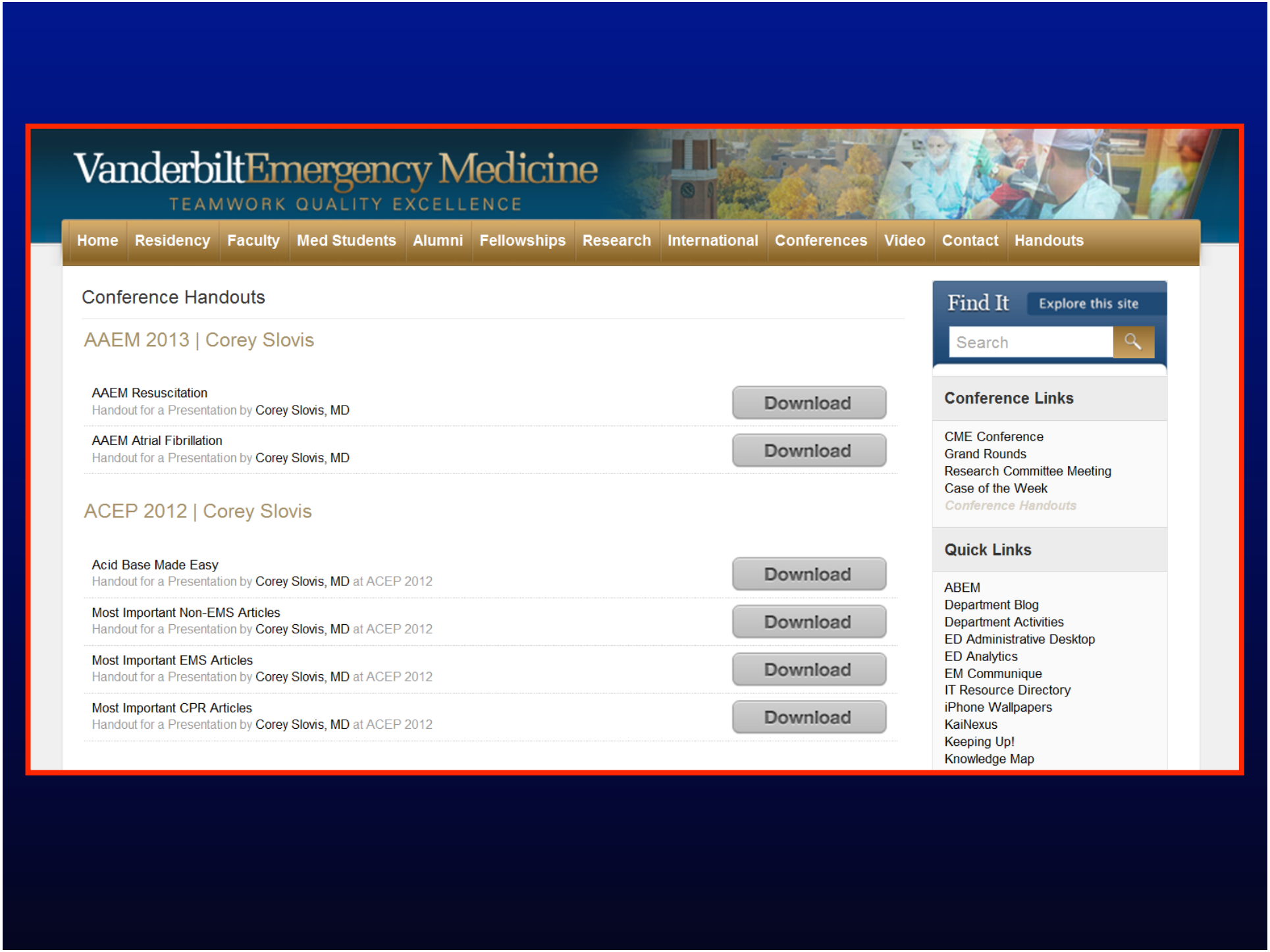
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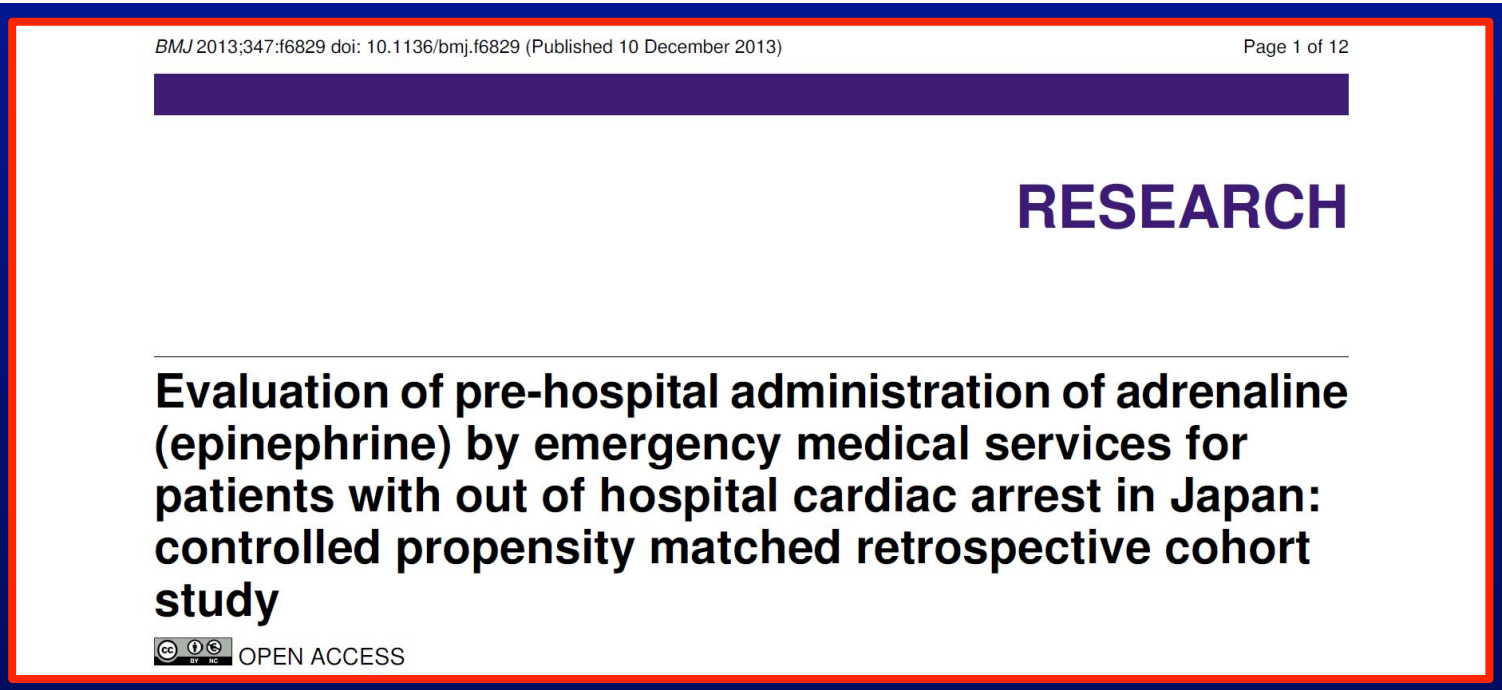
Epinephrine in CPR



BMJ 2013;347:f6829 doi: 10.1136/bmj.f6829 (Published 10 December 2013)

RESEARCH

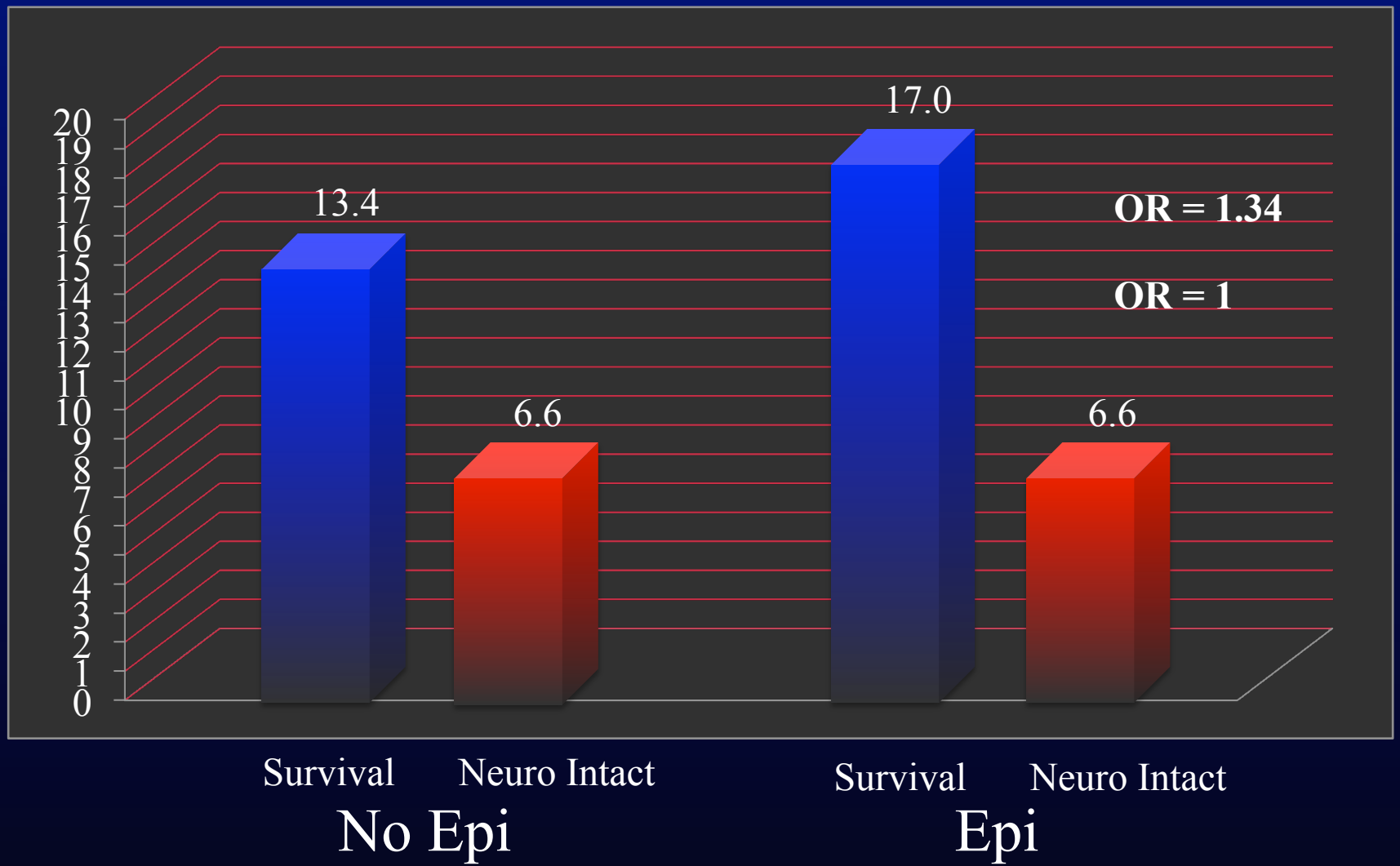
Evaluation of pre-hospital administration of adrenaline (epinephrine) by emergency medical services for patients with out of hospital cardiac arrest in Japan: controlled propensity matched retrospective cohort study

BMJ 2013;347:f6829

- Does Epi have benefit during CPR?
- Retrospective Japanese cohort study
- Used pairs of OOH arrest patients
- Matched for Epi vs No-Epi therapy

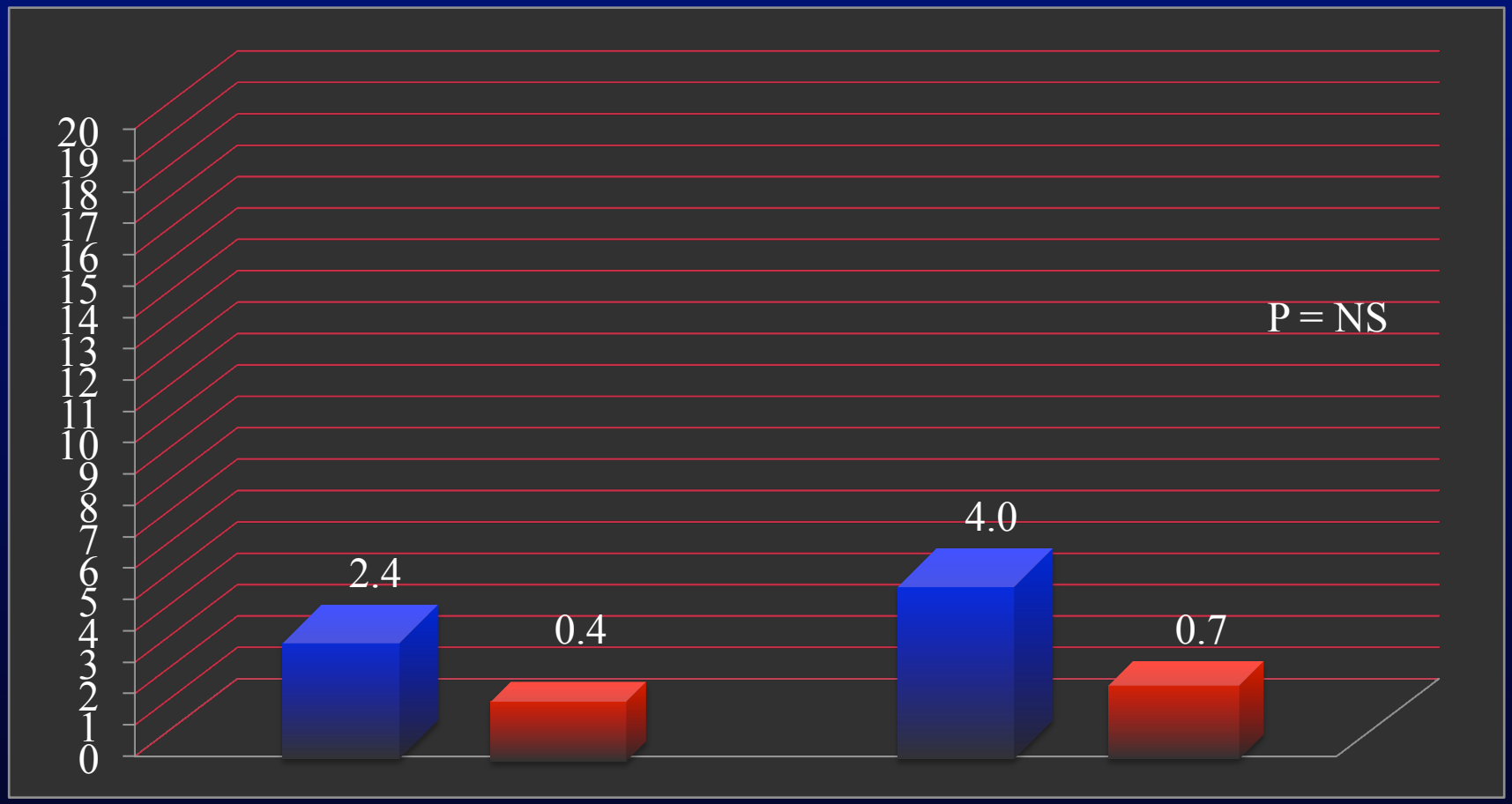
VF/VT (1990 Pairs)
Epi vs No-Epi

BMJ 2013;347:f6829



AS/PEA (9058 Pairs)
Epi vs No-Epi

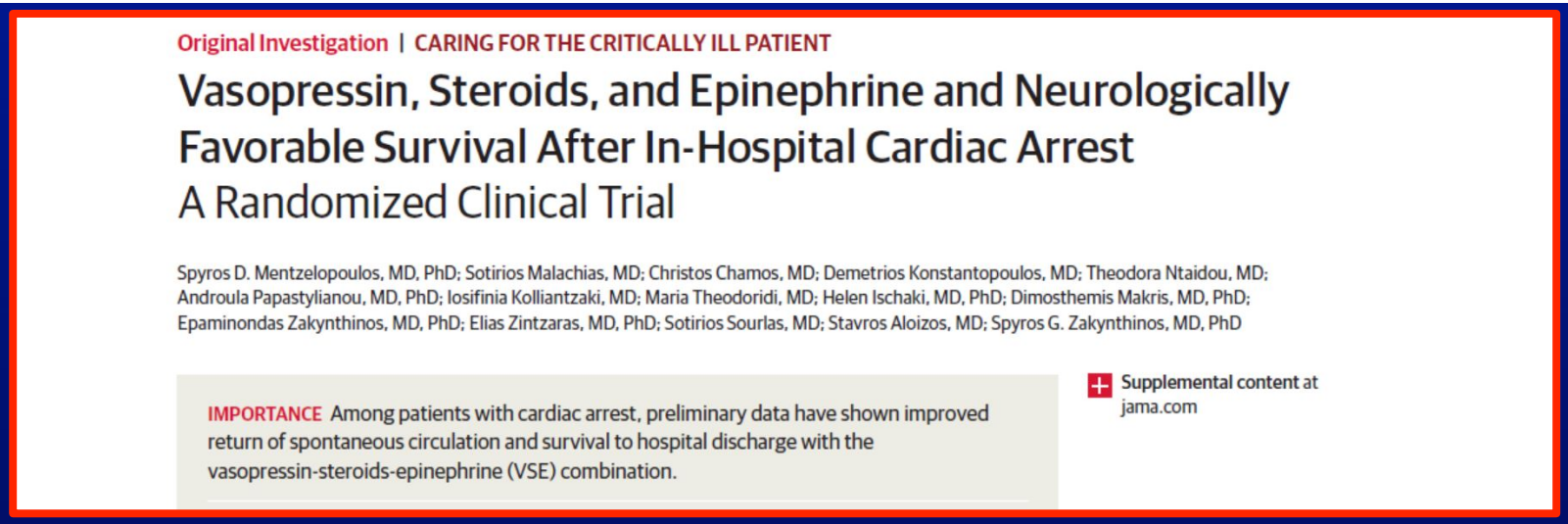
BMJ 2013;347:f6829



Epi vs No-Epi Take Homes

Authors conclude: "Our study showed some favorable effects of pre-hospital epinephrine … The absolute increase in neurologically intact survival, however, was minimal."

I agree – This study does not show real benefits in the vast majority of patients.



Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Vasopressin, Steroids, and Epinephrine and Neurologically Favorable Survival After In-Hospital Cardiac Arrest
A Randomized Clinical Trial

Spyros D. Mentzelopoulos, MD, PhD; Sotirios Malachias, MD; Christos Chamos, MD; Demetrios Konstantopoulos, MD; Theodora Ntaidou, MD; Androula Papastylianou, MD, PhD; Iosifinia Kolliantzaki, MD; Maria Theodoridi, MD; Helen Ischaki, MD, PhD; Dimosthemis Makris, MD, PhD; Epaminondas Zakynthinos, MD, PhD; Elias Zintzaras, MD, PhD; Sotirios Sourlas, MD; Stavros Aloizos, MD; Spyros G. Zakynthinos, MD, PhD

IMPORTANCE Among patients with cardiac arrest, preliminary data have shown improved return of spontaneous circulation and survival to hospital discharge with the vasopressin-steroids-epinephrine (VSE) combination.

Supplemental content at jama.com

JAMA 2013;310:270-279

Does Vasopressin + Epi + Steroids have benefit over Epi alone in cardiac arrest?

- Randomized, double blind, placebo controlled
- 268 consecutive cardiac arrests
- 3 Greek tertiary care hospitals

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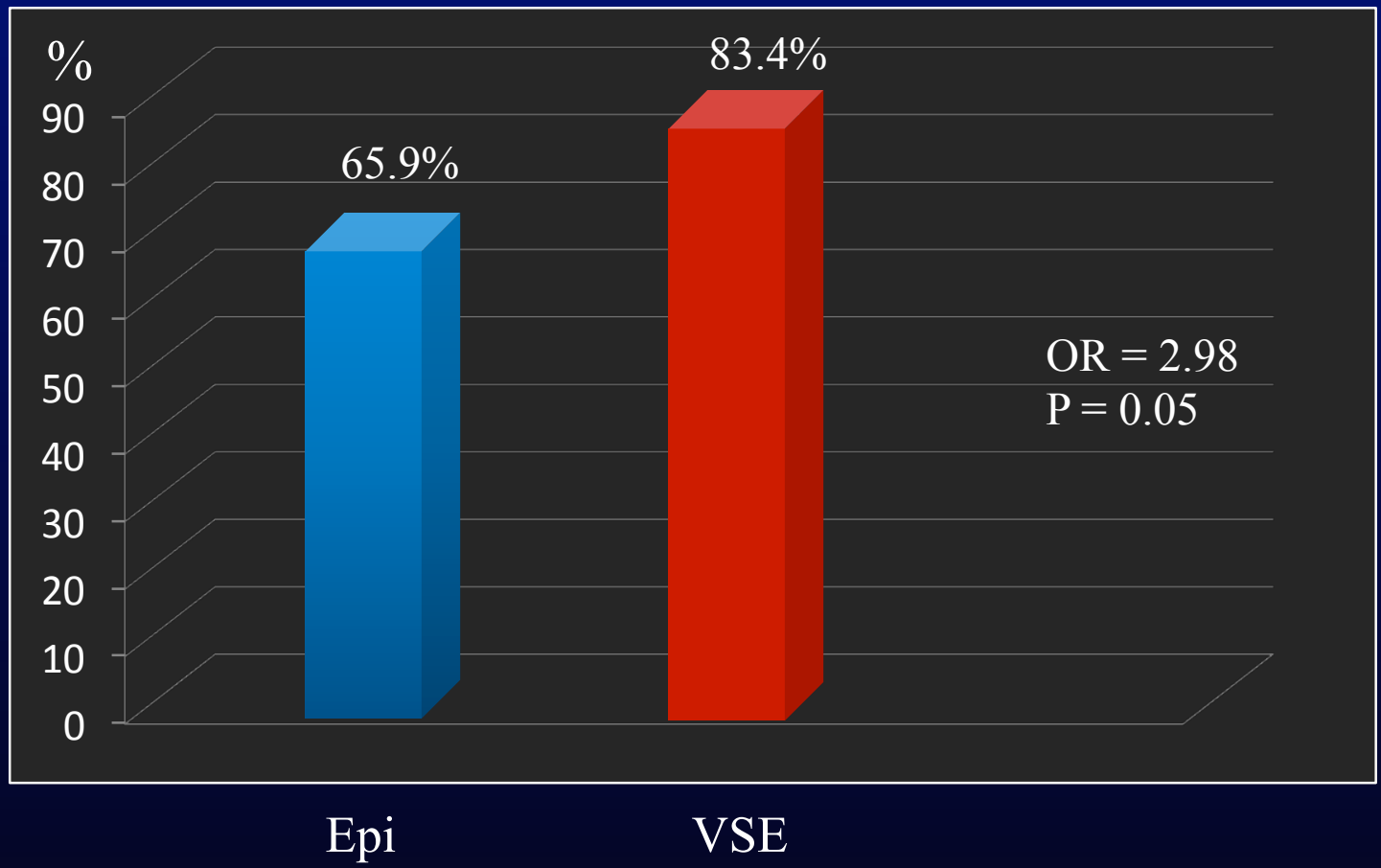
JAMA 2013;310:270-279

- 5 cycles, Q 3 minutes
- Compared Epi 1mg Q3 to:
- Epinephrine 1mg Q 3 minutes
  +
- Vasopressin 20 IU Q 3 minutes
  +
- Solumedrol 40mg *once only*

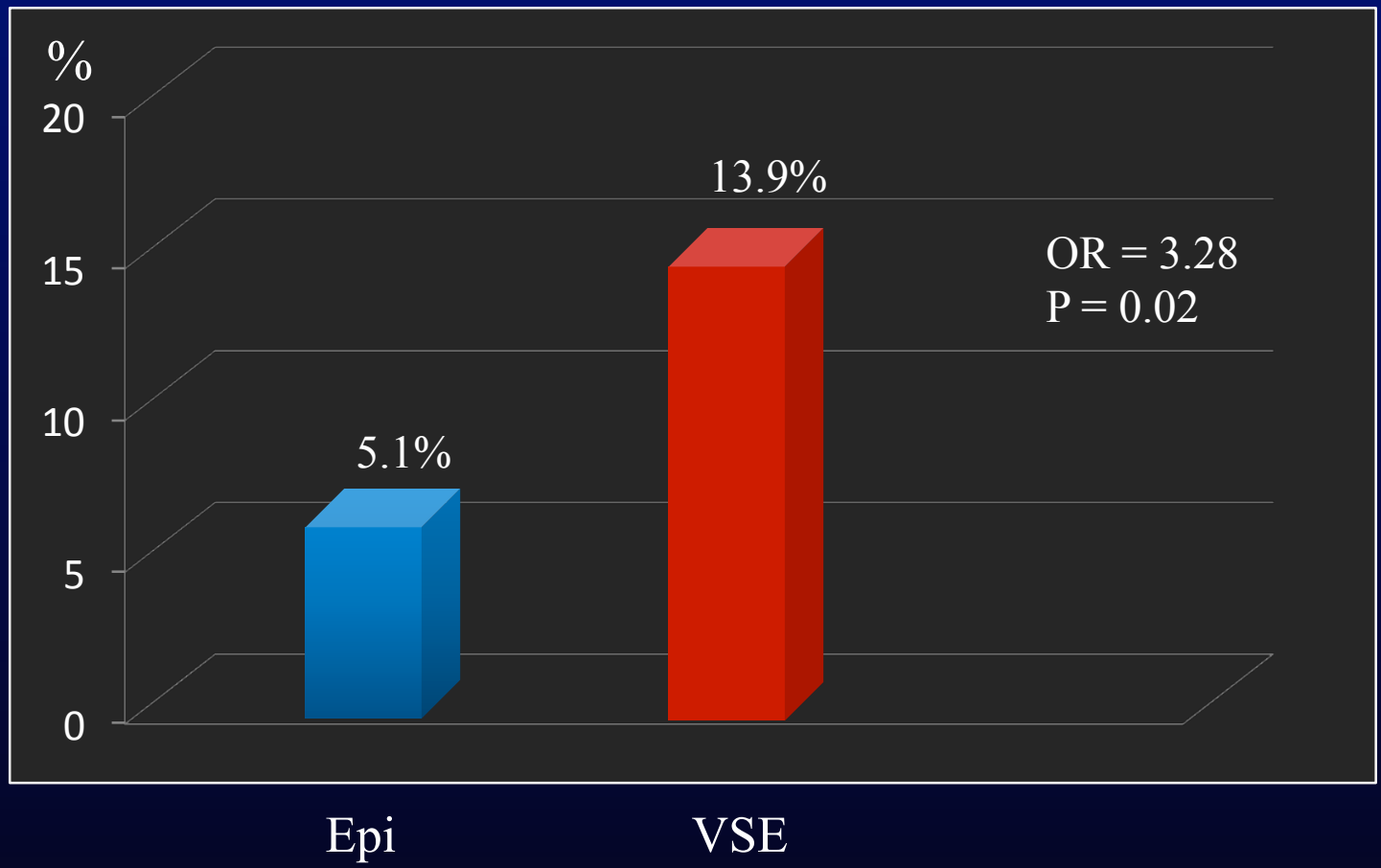
ROSC ≥ 20 min
Epi vs VSE in Cardiac Arrest

JAMA 2013;310:270-279



Survival to Discharge CPC 1 or 2 Epi vs VSE in Cardiac Arrest

JAMA 2013;310:270-279



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JAMA 2013;310:270-279

Authors suggest:

Vasopressin + Epinephrine helps CNS microcirculation during CPR and that steroids enhance vasopressin's beneficial effects

G Model
RESUS-5760; No. of Pages7

ARTICLE IN PRESS

Resuscitation xxx (2013) xxx–xxx

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/resuscitation

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RESUSCITATION

Clinical paper

The impact of peri-shock pause on survival from out-of-hospital shockable cardiac arrest during the Resuscitation Outcomes Consortium PRIMED trial☆

Sheldon Cheskes[a,*], Robert H. Schmicker[b], P. Richard Verbeek[a], David D. Salcido[d], Siobhan P. Brown[b], Steven Brooks[f], James J. Menegazzi[d], Christian Vaillancourt[e], Judy Powell[b], Susanne May[b], Robert A. Berg[g], Rebecca Sell[j], Ahamed Idris[h], Mike Kampp[i], Terri Schmidt[i], Jim Christenson[c], Resuscitation Outcomes Consortium (ROC) investigators

Resuscitation 2013, online Dec

- What's the importance of the peri-shock pause?
- 2,006 patients with pre/post shock times
- Evaluated ΔT pre-shock and post shock
- Compared survival to discharge

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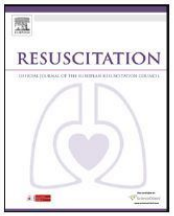


Clinical paper

The impact of peri-shock pause on survival from out-of-hospital shockable cardiac arrest during the Resuscitation Outcomes Consortium PRIMED trial☆

Resuscitation 2013, online Dec

- 29% of pts had pre-shock pause > 20 seconds
- Median ΔT to shock was 15 seconds
- 6.5% had a post-shock pause > 20 seconds
- Median ΔT to resume CPR was 6 seconds

Optimal pre-shock pause is < 10 seconds

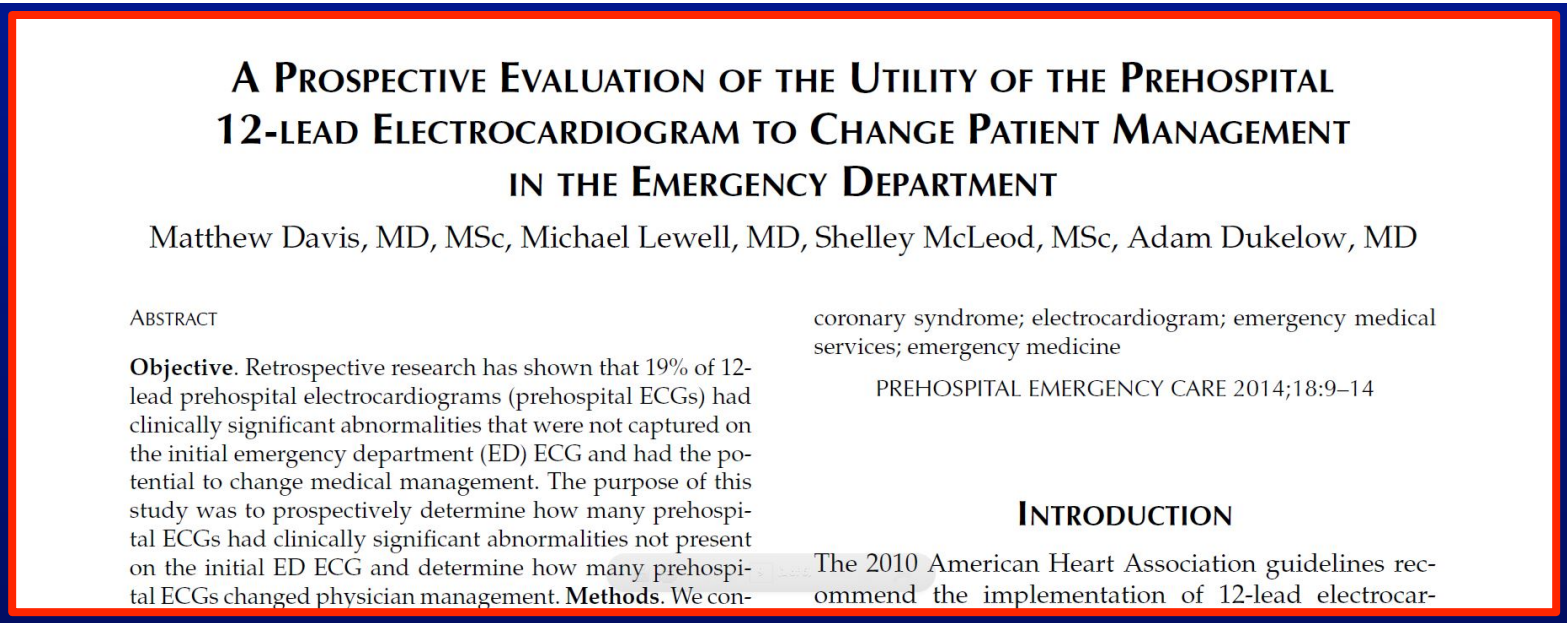
< 10 sec vs > 20 sec increases survival (OR = 1.5)

Peri-shock Pauses Take Homes

- Be ready to shock before stopping CPR
- Stop CPR and shock near simultaneously
- Hands on CPR?
- Post shock interval is not as important

Prehospital ECGs

- Prehospital ECGs save 20 – 30 min
- AHA – ACC Class I recommendation
- D_2B in now E_2B
- Establishes EMS as the vital first link in chain of survival



A Prospective Evaluation of the Utility of the Prehospital 12-lead Electrocardiogram to Change Patient Management in the Emergency Department

Matthew Davis, MD, MSc, Michael Lewell, MD, Shelley McLeod, MSc, Adam Dukelow, MD

ABSTRACT

Objective. Retrospective research has shown that 19% of 12-lead prehospital electrocardiograms (prehospital ECGs) had clinically significant abnormalities that were not captured on the initial emergency department (ED) ECG and had the potential to change medical management. The purpose of this study was to prospectively determine how many prehospital ECGs had clinically significant abnormalities not present on the initial ED ECG and determine how many prehospital ECGs changed physician management. **Methods**. We con-

coronary syndrome; electrocardiogram; emergency medical services; emergency medicine

PREHOSPITAL EMERGENCY CARE 2014;18:9–14

INTRODUCTION

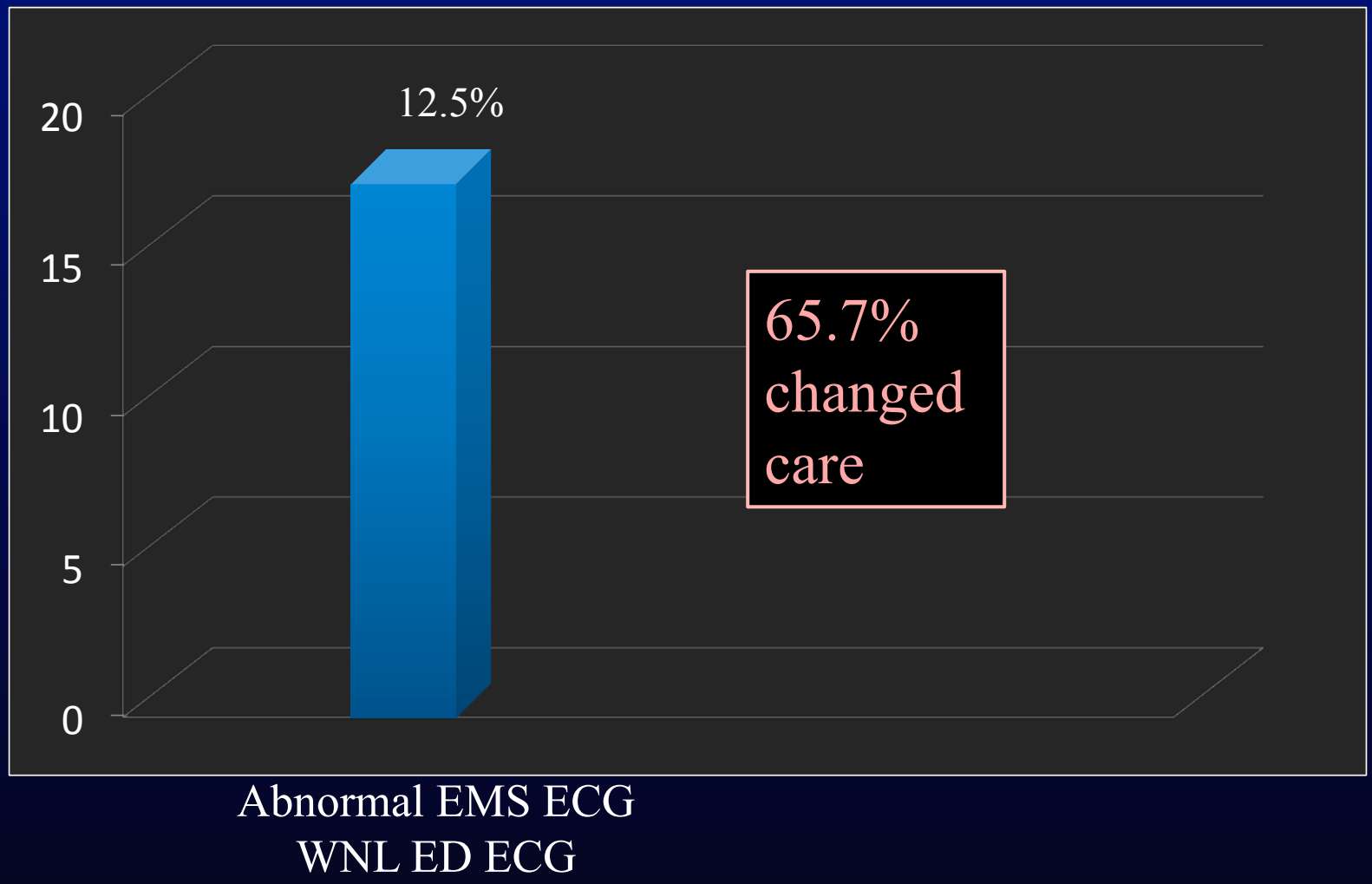
The 2010 American Heart Association guidelines rec-ommend the implementation of 12-lead electrocar-

Prehosp Emerg Care 2014;18:9-14

- How often does the EMS ECG change ED management?
- How often are EMS ECG abnormalities gone by ED arrival?
- Prospective study, 281 patients, western Ontario

Abnormal EMS ECGs vs WNL ED ECGs

Prehosp Emerg Care 2014;18:9-14



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coronary syndrome; electrocardiogram; emergency medical services; emergency medicine

PREHOSPITAL EMERGENCY CARE 2014;18:9–14

Prehosp Emerg Care 2014;18:9-14

EMS ECG Changes Gone By Arrival

(n = 35)

ST Depression (11)

T Wave Inversion (4)

ST Elevation (2)

EMS ECG Changed Management in 2/3 of These Patients

THERAPUTIC HYPOTHERMIA

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

Niklas Nielsen, M.D., Ph.D., Jørn Wetterslev, M.D., Ph.D., Tobias Cronberg, M.D., Ph.D., David Erlinge, M.D., Ph.D., Yvan Gasche, M.D., Christian Hassager, M.D., D.M.Sci., Janneke Horn, M.D., Ph.D., Jan Hovdenes, M.D., Ph.D.,

New Engl J Med 2013, 369:2197-2206

- What temperature for Therapeutic Hypothermia?
- 939 patients in randomized trial
- 36 ICUs in Europe and Australia
- Evaluated: mortality & neuro outcome at 180d
- 80% VF/VT; 20% AS and PEA *(12%/7%)*

ORIGINAL ARTICLE

Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

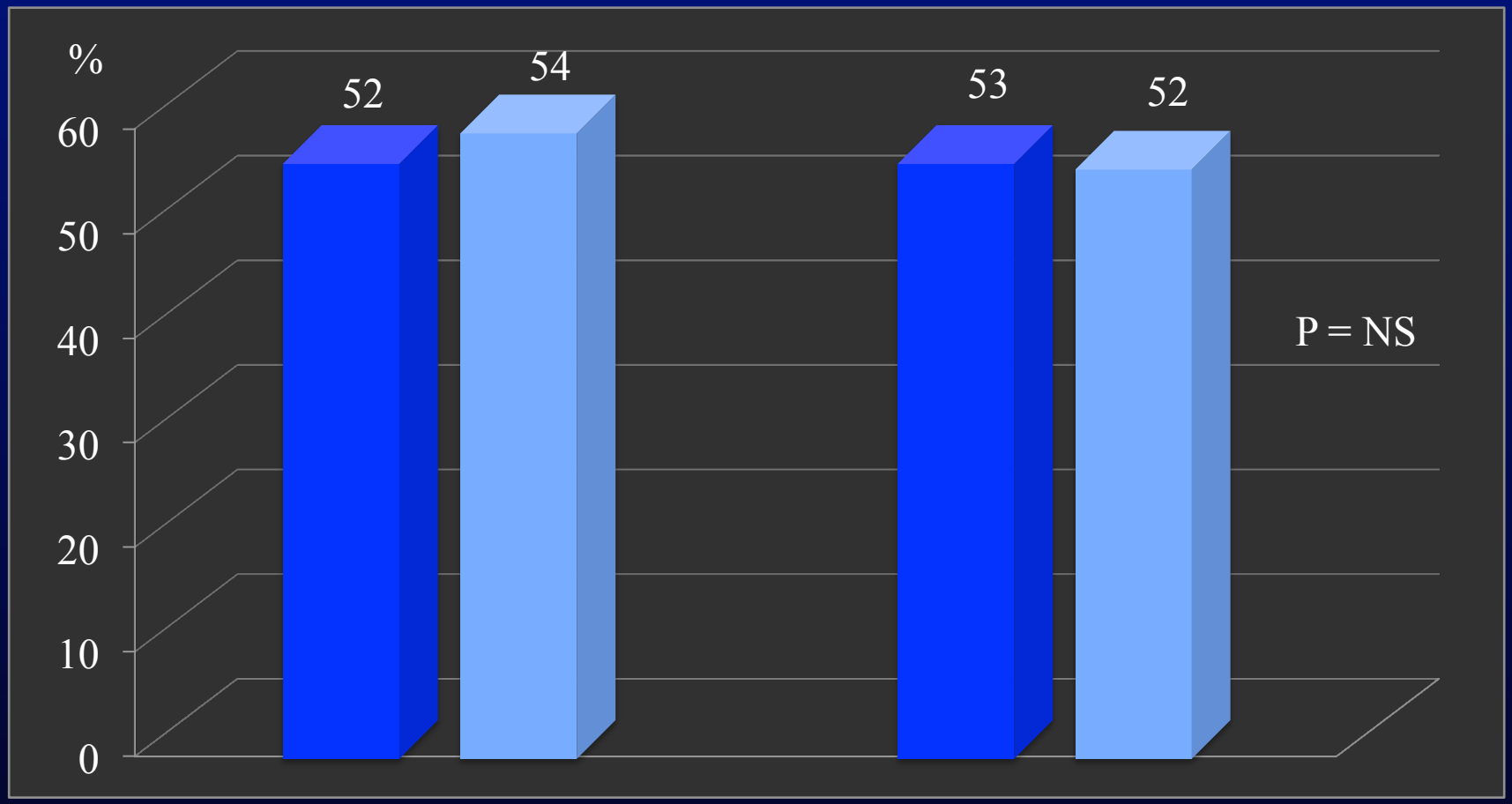
Niklas Nielsen, M.D., Ph.D., Jørn Wetterslev, M.D., Ph.D., Tobias Cronberg, M.D., Ph.D., David Erlinge, M.D., Ph.D., Yvan Gasche, M.D., Christian Hassager, M.D., D.M.Sci., Janneke Horn, M.D., Ph.D., Jan Hovdenes, M.D., Ph.D.,

New Engl J Med 2013, 369:2197-2206

- Compares 32˚-33˚ to 35˚-36˚ TH
- No unwitnessed Asystole patients
- 24% intravascular; 76% surface cooled
- 28 hours of cooling
- Rewarmed at 0.5˚/hour

Hypothermia vs Normal Temp Survival and Neuro Outcomes

New Engl J Med 2013, 369:2197-2206



Therapeutic Hypothermia Take Homes

- The future of deep TH is unclear
- Preventing Hyperthermia appears crucial
- Future studies will determine optimal TH temp
- Well done study, but likely not the final study
- 35˚ – 36˚ looks like the new 32˚ – 34˚

Original Investigation

Effect of Prehospital Induction of Mild Hypothermia on Survival and Neurological Status Among Adults With Cardiac Arrest

A Randomized Clinical Trial

Francis Kim, MD; Graham Nichol, MD, MPH; Charles Maynard, PhD; Al Hallstrom, PhD; Peter J. Kudenchuk, MD; Thomas Rea, MD, MPH; Michael K. Copass, MD; David Carlbom, MD; Steven Deem, MD; W. T. Longstreth Jr, MD; Michele Olsufka, RN; Leonard A. Cobb, MD

IMPORTANCE Hospital cooling improves outcome after cardiac arrest, but prehospital cooling immediately after return of spontaneous circulation may result in better outcomes.

Editorial

Supplemental content at jama.com

JAMA 2013, in press

- Does Prehospital TH have benefits?
- 1.359 patients; Randomized trial
- King County Washington Medic 1
- 583 with VF; 776 without VF
- Almost all patients cooled on hospital arrival

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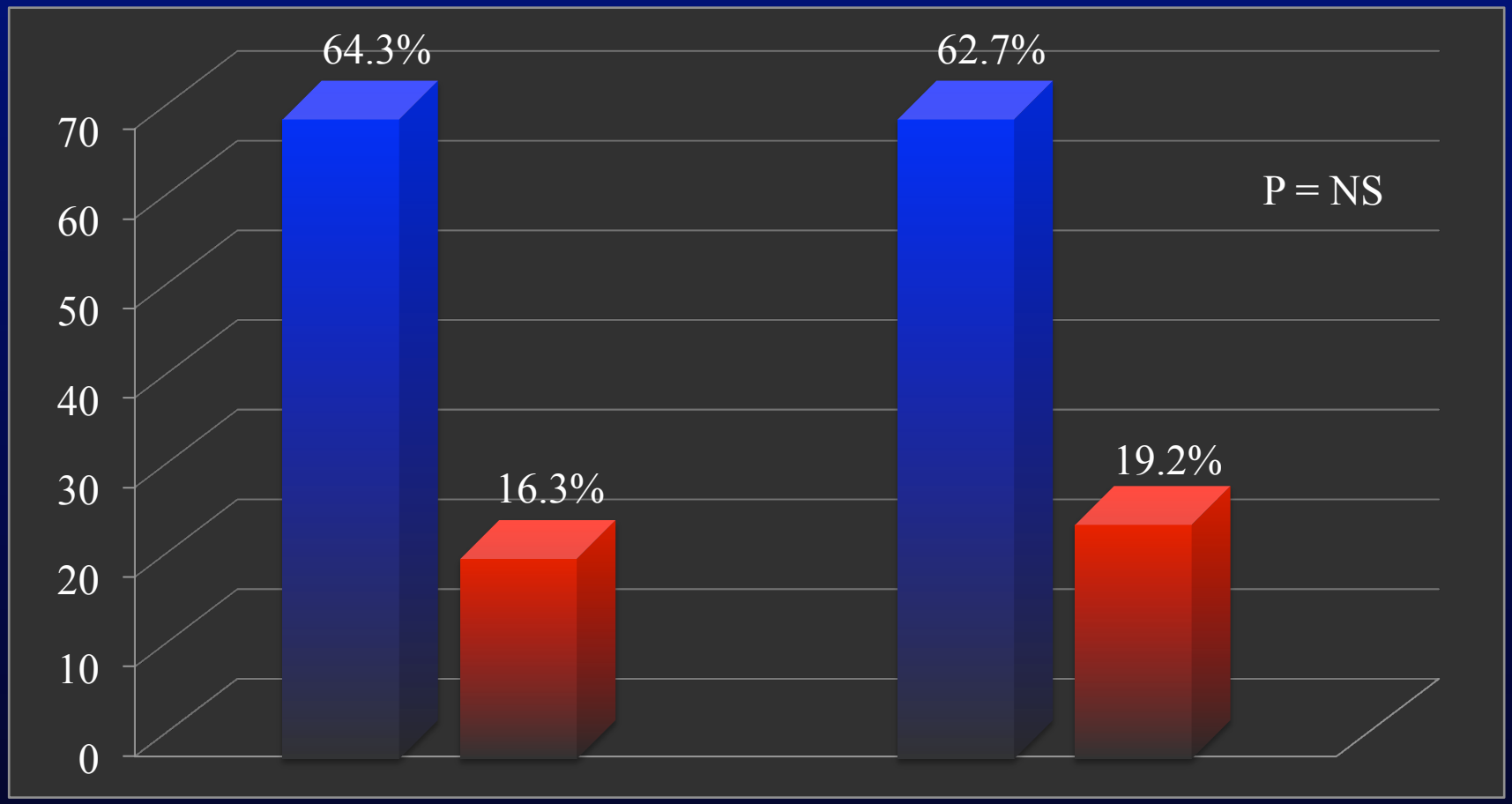
JAMA 2013, in press

- EMS cooling: up to 2L of 4° C LR
- Mean core temp ↓ by 1.20°C to ED
- EMS patients took 1 hr less to get to 34°
- Study evaluated mortality and neuro status
- EMS pts: 7-10mg pavulon + 1-2mg valium

Survival to Discharge

JAMA 2013, in press



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Additional Results

JAMA 2013, in press

- No improvement in neuro status in any group
- EMS TH group had more re-arrests
  (26% vs 21%; p = 0.008)
- EMS TH group had more pulmonary edema
  (41% vs 30%; p < 0.001)
- No difference in pressor use (9%)

Prehospital TH Induction Take Homes

- TH by EMS offers no benefits
- Lots of EMS training, resources and expense, yet no benefits shown
- In my opinion: this is a large and definitive study

Is oxygen dangerous?

Hyperoxia is associated with increased mortality in patients treated with mild therapeutic hypothermia after sudden cardiac arrest*

David R. Janz, MD; Ryan D. Hollenbeck, MD; Jeremy S. Pollock, MD; John A. McPherson, MD; Todd W. Rice, MD, MSc

Objective: To determine whether higher levels of $Pa0_2$ are associated with in-hospital mortality and poor neurological status at hospital discharge in patients treated with mild therapeutic hypothermia after sudden cardiac arrest.

Design: Retrospective analysis of a prospective cohort.

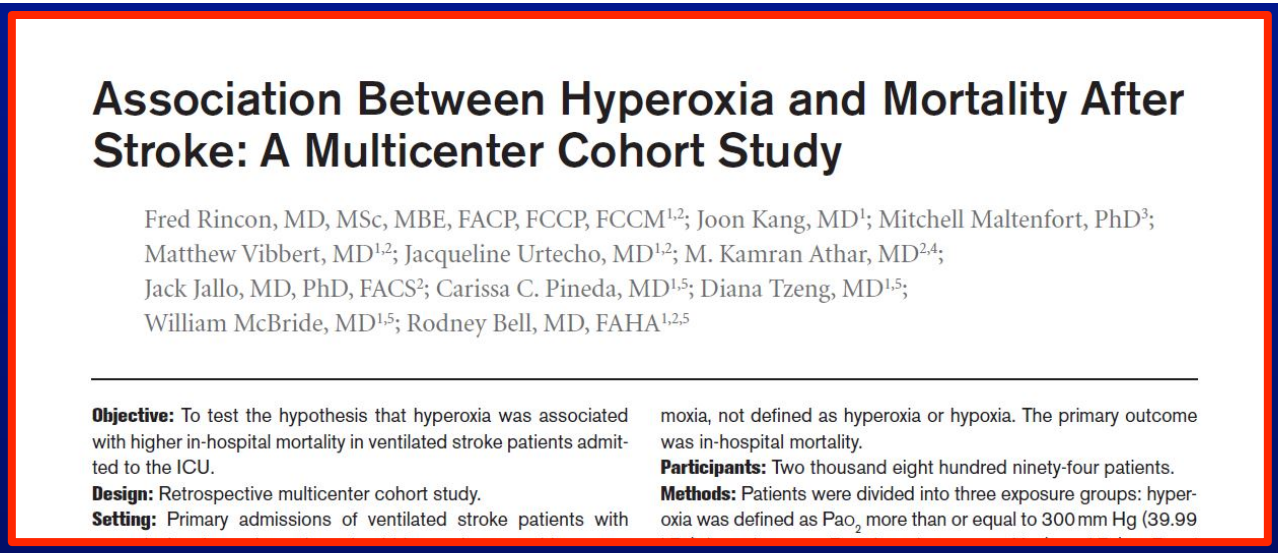
Patients: A total of 170 consecutive patients treated with therapeutic hypothermia in the cardiovascular care unit of an academic

spontaneous circulation, the presence of shock, bystander cardiopulmonary resuscitation, and initial rhythm revealed that higher levels of $Pa0_2$ were significantly associated with increased in-hospital mortality (odds ratio 1.439; 95% confidence interval 1.028–2.015; $p = .034$) and poor neurological status at hospital discharge (odds ratio 1.485; 95% confidence interval 1.032–2.136; $p = .033$).

Crit Care Med 2012;40:3135-39

Does increased oxygen tension affect mortality in patients treated with TH s/p cardiac arrest

- 170 consecutive patients
- Retrospectively evaluated PaO_2
- Evaluated mortality and neuro status
- Used highest PaO_2 in first 24 hours



Association Between Hyperoxia and Mortality After Stroke: A Multicenter Cohort Study

Fred Rincon, MD, MSc, MBE, FACP, FCCP, FCCM[1,2]; Joon Kang, MD[1]; Mitchell Maltenfort, PhD[3]; Matthew Vibbert, MD[1,2]; Jacqueline Urtecho, MD[1,2]; M. Kamran Athar, MD[2,4]; Jack Jallo, MD, PhD, FACS[2]; Carissa C. Pineda, MD[1,5]; Diana Tzeng, MD[1,5]; William McBride, MD[1,5]; Rodney Bell, MD, FAHA[1,2,5]

Objective: To test the hypothesis that hyperoxia was associated with higher in-hospital mortality in ventilated stroke patients admitted to the ICU.
Design: Retrospective multicenter cohort study.
Setting: Primary admissions of ventilated stroke patients with moxia, not defined as hyperoxia or hypoxia. The primary outcome was in-hospital mortality.
Participants: Two thousand eight hundred ninety-four patients.
Methods: Patients were divided into three exposure groups: hyperoxia was defined as Pao_2 more than or equal to 300 mm Hg (39.99

Crit Care Med 2013, in press

- Does hyperoxia affect stroke mortality?
- Multicenter study of 8,554 pts; in 84 US ICUs
- Ischemic strokes, SAH, hemorrhagic strokes
- Three groups: Hypoxic, WNL, Hyperoxia
- Hyperoxia defines as $PaO_2 > 300$

Cornet *et al. Critical Care* 2013, **17**:313
http://ccforum.com/content/17/2/313

CRITICAL CARE

VIEWPOINT

The potential harm of oxygen therapy in medical emergencies

Alexander D Cornet*[1-3], Albertus J Kooter[1,3], Mike JL Peters[1,3] and Yvo M Smulders[1,3]

Abstract

In medical emergencies, supplemental oxygen is often administrated routinely. Most paramedics and

20 minutes to patients in the first days following myocardial infarction resulted in a 17% decrease in cardiac output and a 5% rise in arterial blood pressure [9]. Three years later, it was confirmed that high-flow oxygen

Crit Care 2013;17:313-314

Potential Deleterious Effects of Hyperoxia

- CVA: Cerebral vasoconstriction
- AMI: coronary vasoconstriction
- COPD: increased risk for intubation
- s/p CPR: decreased neurological recovery
- Sepsis: impaired O_2 delivery
- Hem shock: compromised hemodynamics

Cornet *et al. Critical Care* 2013, **17**:313
http://ccforum.com/content/17/2/313

VIEWPOINT

The potential harm of oxygen therapy in medical emergencies

Alexander D Cornet*[1-3], Albertus J Kooter[1,3], Mike JL Peters[1,3] and Yvo M Smulders[1,3]

Crit Care 2013;17:313-314

An easy to read up to date article with 61 references that helps to teach us that an O_2 Sat of about 92-94% is what to aim for.

There is no evidence that aiming for 98-100% is beneficial and lots of evidence that hyperoxia has significant potential deleterious effects.

Oxygen and Hyperoxia Take Homes

92 – 94% O_2 Sat
is the new normal

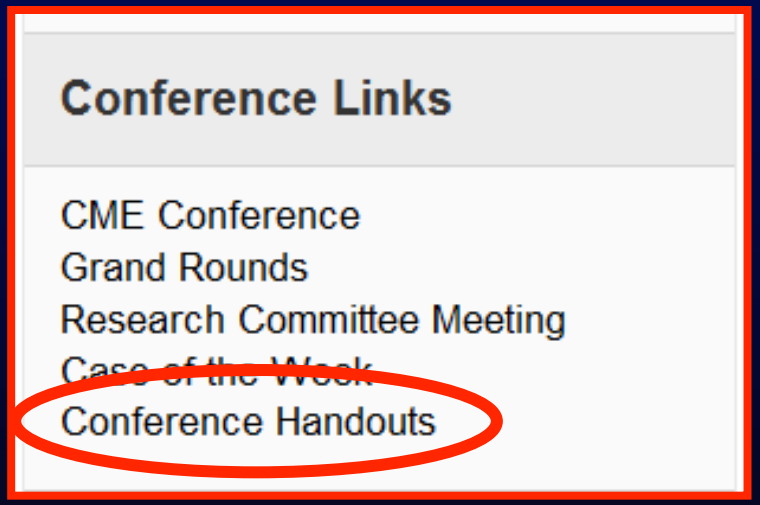
89 – 92% in COPD!!

Intubate, Oxygenate and Hyperventilate

Summary

- Consider VSE
- One ECG Begets Another
- Perishock Pause < 10 sec
- TH May Be Warmer: 35°- 36°
- 89-92 and 94-95

VanderbiltEM.com

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