

## ACEP EAGLES 2014 The Role of Epinephrine in CPR

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### Pulseless, Non VF

- Intubate, Oxygenate and Hyperventilate
- Epinephrine 1mg 1VP
- Atropine 1mg 1VP
- 1mg CaCl
- 2 Amp Bicarbonate

#### Resuscitation From Ventricular Fibrillation

Drug Therapy

*Joseph S. Redding, MD, and John W. Pearson, MD*

In resuscitating dogs subjected to ten minutes of circulatory arrest due to ventricular fibrillation, a number of drugs were used with artificial ventilation of the lungs, external cardiac massage, and external electrical counter-  
between the two vasopressors when they are used in resuscitation from ventricular fibrillation, and to evaluate several other types of drug therapy which have been advocated for this purpose.

Table 2.—Relation Between Drug Therapy and Survival

Group*	Drug, Dose	Circulation Restored	Condition in 24 hr		
			Awake	Unconscious	Dead
A	None	1			1
B	Sodium bicarbonate, 1.5 gm	0			
C	Epinephrine, 1 mg	7	3	2	2
D	Epinephrine, 1 mg; lidocaine, 40 mg	7	1	1	5
E	Phenylephrine hydrochloride, 10 mg	10	3	3	7
F	Methoxamine hydrochloride, 20 mg	13	2	1	10
G	Epinephrine, 1 mg; sodium bicarbonate, 1.5 gm	13	10	1	2

\*Each group contained 15 dogs.

#### Prehospital Epinephrine Use and Survival Among Patients With Out-of-Hospital Cardiac Arrest

Akihito Hagihara, DMSc, MPH  
Manabu Hasegawa, MD  
Takemi Abe, MA  
Takashi Nagata, MD  
Yoshifumi Wakata, MD

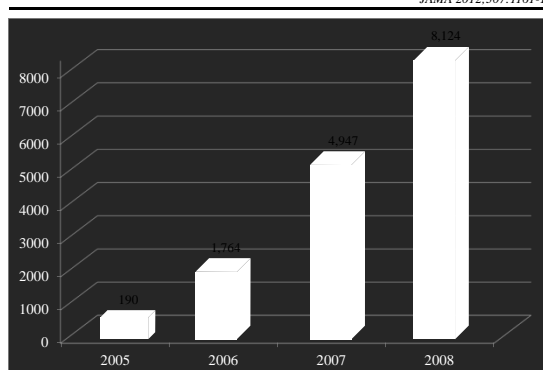
**Context** Epinephrine is widely used in cardiopulmonary resuscitation for out-of-hospital cardiac arrest (OHCA). However, the effectiveness of epinephrine use before hospital arrival has not been established.  
**Objective** To evaluate the association between epinephrine use before hospital arrival and short- and long-term mortality in patients with cardiac arrest.

JAMA 2012;307:1161-1168

- Does Epinephrine improve outcome?
- 15,030 Cardiac Arrests with Epinephrine
- 402,158 Patients without Epinephrine
- ROSC and 1 month Survival measured
- Neurologic disability also evaluated

#### Epinephrine Use in Japan

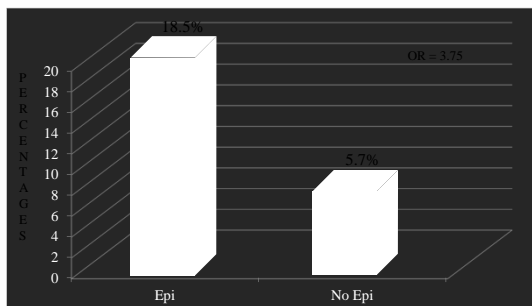
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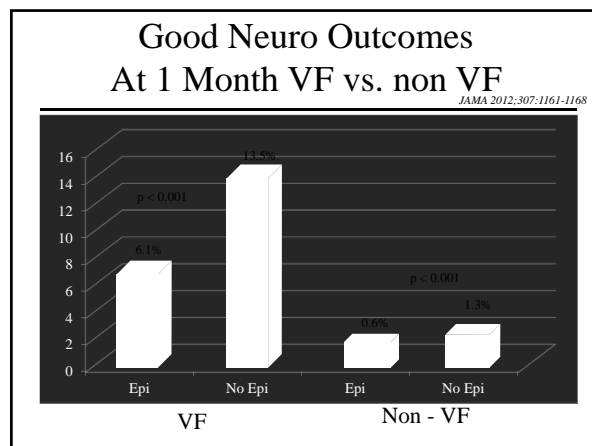
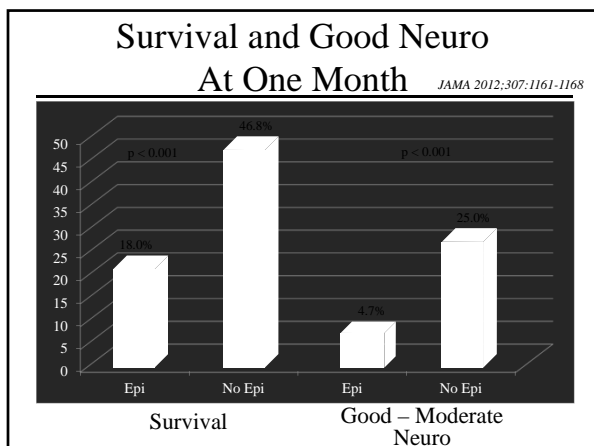


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ROSC

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**Design, Setting, and Participants** Prospective, nonrandomized, observational study.

*JAMA 2012;307:1161-1168*

- Epinephrine increases ROSC
- It decreases long term survival
- Epinephrine decreases chances of good neuro outcomes in survivors

### CME Association Between Timing of Epinephrine Administration and Intact Neurologic Survival Following Out-of-hospital Cardiac Arrest in Japan: A Population-based Prospective Observational Study

Shinji Nakahara, MD, PhD, Jun Tomio, MD, PhD, Masamichi Nishida, MD, PhD, Naoto Morimura, MD, PhD, Masao Ichikawa, MPH, PhD, and Tetsuya Sakamoto, MD, PhD

*Acad Emerg Med;2012:782-792*

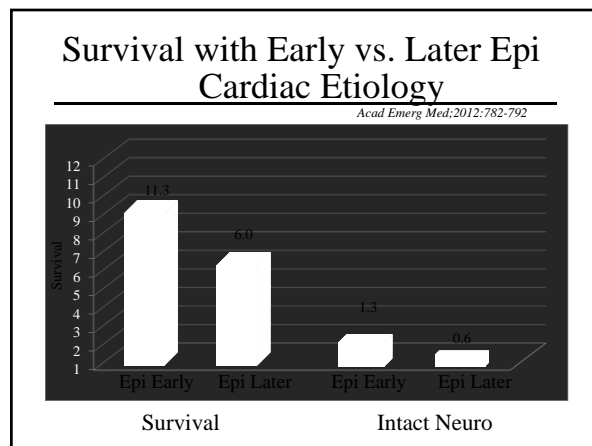
- 49,165 patients
- Retrospective study of prospective data

Does early Epinephrine in CPR make a difference in neurologic outcome?

### Early vs. Later Epinephrine

*Acad Emerg Med;2012:782-792*

- Study compares “early” Epi administration given in less than 10 minutes of ACLS being started, and a group that did not receive Epi within 10 minutes of ACLS
- Excludes ROSC in less than 8 minutes



## Epinephrine in Cardiac Arrest Take Homes

- Epinephrine probably works
- The sooner the better
- Give ASAP if needed
- Late dosing: little to no value

We are still unsure after 50 years of Epi

### 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 Papastylaniou, MD, PhD, Ioannina Kollantziaki, MD, Maria Theodoraki, MD, Helen Ichaki, MD, PhD, Dimosthenis 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-steroid-epinephrine (VSE) combination.

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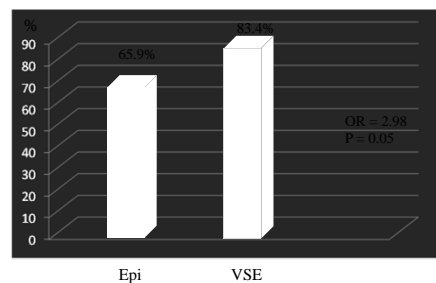
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- 5 cycles, Q 3 minutes
- Compared Epi 1mg Q3 to:
- Epinephrine 1mg Q 3 minutes  
+  
• Vasopressin 20 IU Q 3 minutes  
+  
• Solumedrol 40mg once only

## ROSC $\geq$ 20 min Epi vs VSE in Cardiac Arrest

JAMA 2013;310:270-279



## Additional Results and Comments

JAMA 2013;310:270-279

- VSE group received stress dose steroids tapered over 7 days
- Those survivors in shock post ROSC did significantly better with VSE and were more likely to survive with CPC 1 or 2 (OR = 3.74)

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### Authors suggest:

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

## Vasopressin + Epinephrine + Steroids Take Homes

*JAMA 2013;310:270-279*

- VSE has potential
- Single study of in-patients
- More PEA in VSE group  
(19% vs 13%, p=ns)
- More AS in E group  
(70% vs 64%, p=ns)
- Maybe worth trying; doesn't hurt



*Resuscitation 2014;85:732-40*

- Does Epinephrine use have true benefits in CPR?
- Meta analysis, 14 RCTs, 12,246 patients
- Studies were:
  - Epi vs placebo (1) n = 534
  - Epi vs high dose Epi (6) n = 6,174
  - Epi vs Vasopressin (1) n = 336
  - Epi vs Epi + Vasopressin (6) n = 5,202

## Results

*Resuscitation 2014;85:732-40*

- Epi vs placebo (1) n = 534 ↑ROSC  
*- No differences in survival or neuro outcome*
- Epi vs High dose Epi (6) n = 6,174  
*- No differences in survival or neuro outcome*
- Epi vs Epi + Vasopressin (6) n = 5,202  
*- No differences in ROSC, admit, survival or neuro*
- Epi vs Vasopressin (1) n = 336  
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## Benefits of Epinephrine in CPR Conclusions and Take Homes

- Very hard to prove efficacy
- Very hard to stop using it
- Epi + Vasopressin + steroids??
- Future studies will hopefully help us define its role or lack there of

