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RESURCOR - RENAIR**

**Actualités dans la prise en charge de l'arrêt cardiaque**

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# Dispatch CPR

EMERGENCY MEDICAL SERVICES/ORIGINAL RESEARCH

## Effect of Dispatcher-Assisted Cardiopulmonary Resuscitation Program and Location of Out-of-Hospital Cardiac Arrest on Survival and Neurologic Outcome

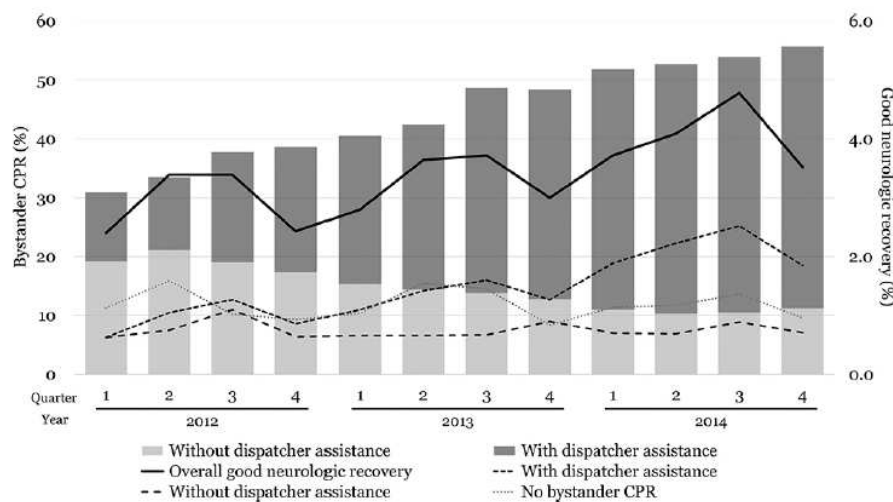


Young Sun Ro, MD, DrPH; Sang Do Shin, MD, PhD\*; Yu Jin Lee, MD; Seung Chul Lee, MD, PhD; Kyoung Jun Song, MD, PhD; Hyun Wook Ryoo, MD, PhD; Marcus Eng Hock Ong, MD; Bryan McNally, MD, MPH; Bentley Bobrow, MD; Hideharu Tanaka, MD; Helge Myklebust, BEng; Tonje Søråas Birkenes, PhD

\*Corresponding Author. E-mail: [Shinsangdo@gmail.com](mailto:Shinsangdo@gmail.com).

## Dispatch CPR

- Registre national coréen des AC
- 37 924 patients en 2 ans
- Progression de la T-RCP de 11 à 44%

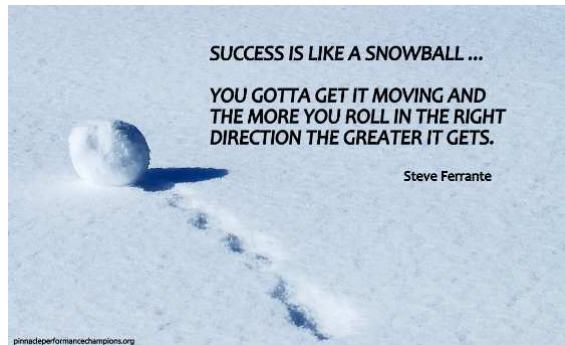


**Figure 2.** Trends of bystander CPR with and without dispatcher assistance and good neurologic outcome.

## Dispatch CPR - Singapore

Leadership au téléphone

- Autorité
- Interaction
- Momentum



## Dispatch CPR - Singapore

Ne **PAS** dire :

Est-ce que vous savez faire une RCP ?  
Est-ce que vous pouvez faire la RCP ?  
Est-ce que quelque quelqu'un connait ?  
Passez moi quelqu'un d'autre...

Mais y aller pas à pas...



Barriers to dispatch assisted CPR – Ho et al, Resuscitation 2016

## Application de géolocalisation



### He has saved nearly 20 lives since age 13



Seventeen-year-old Muhammad Luqman Abdul Rahman responds to emergencies because he knows he would want others to do the same for him, should he need help. PHOTO: AZIZ HUSSIN FOR THE STRAITS TIMES

© PUBLISHED: AUG 9, 2017, 5:00 AM SGT | UPDATED: SEP 15, 2017, 3:15 PM

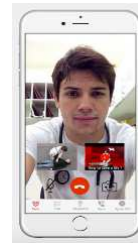
## PREPS 2016 - Étude DISPATCH

*Multifaceted intervention for increasing performance of cardiopulmonary resuscitation by laypersons in out-of-hospital cardiac arrest. A stepped wedge cluster randomized controlled trial.*

- Appel offre DGOS Etude multicentrique, randomisée
- 14 SAMU
- 1950 patients



Formation  
Reconnaissance de  
l'AC  
EAD



## RCP par témoin et AC pédiatrique

JAMA Pediatrics | [Original Investigation](#)

### Association of Bystander Cardiopulmonary Resuscitation With Overall and Neurologically Favorable Survival After Pediatric Out-of-Hospital Cardiac Arrest in the United States A Report From the Cardiac Arrest Registry to Enhance Survival Surveillance Registry

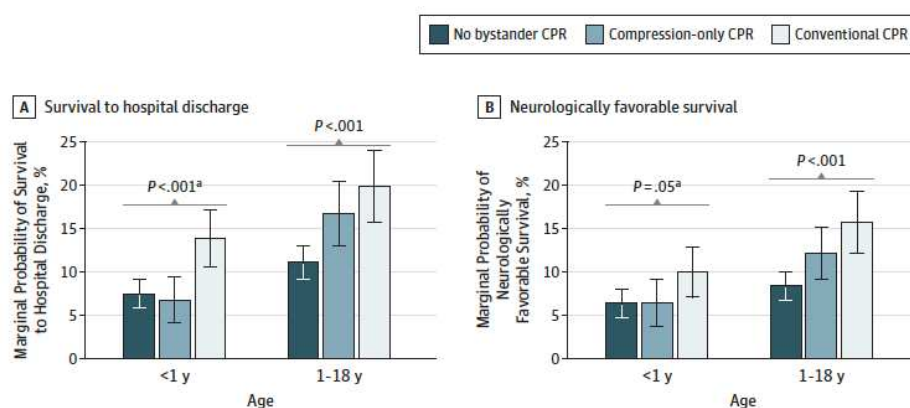
Maryam Y. Naim, MD; Rita V. Burke, PhD, MPH; Bryan F. McNally, MD, MPH; Lihai Song, MS;  
Heather M. Griffiths, PhD; Robert A. Berg, MD; Kimberly Vellano, MPH; David Markenson, MD;  
Richard N. Bradley, MD; Joseph W. Rossano, MD, MS

## RCP par témoin et AC pédiatrique

- Registre US Cares
- 3900 enfants < 18 ans
- RCP par témoin survie 11,9% vs pas de RCP 6,9%
- Disparités raciales importantes
  - Blancs 11,1%, Afro-américains 6,7%, Hispaniques 9,2%
- Analyse avec compressions seules et RCP avec ventilation



## RCP par témoin et AC pédiatrique



## Gasps et AC

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<http://dx.doi.org/10.1016/j.jacc.2017.07.782>

### Long-Term Prognostic Value of Gasping During Out-of-Hospital Cardiac Arrest



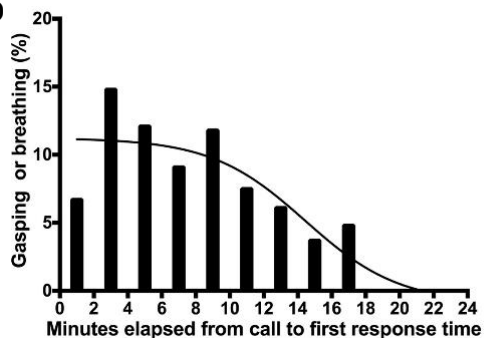
Guillaume Debaty, MD, PhD,<sup>a,b</sup> Jose Labarere, MD, PhD,<sup>a,c</sup> Ralph J. Frascione, MD,<sup>d</sup> Marvin A. Wayne, MD,<sup>e</sup> Robert A. Swor, MD,<sup>f</sup> Brian D. Mahoney, MD,<sup>g</sup> Robert M. Domeier, MD,<sup>h</sup> Michael L. Olinger, MD,<sup>i</sup> Brian J. O'Neil, MD,<sup>j</sup> Demetris Yannopoulos, MD,<sup>k</sup> Tom P. Aufderheide, MD,<sup>l</sup> Keith G. Lurie, MD<sup>f</sup>

## Gasps et AC

1880 patients inclus.

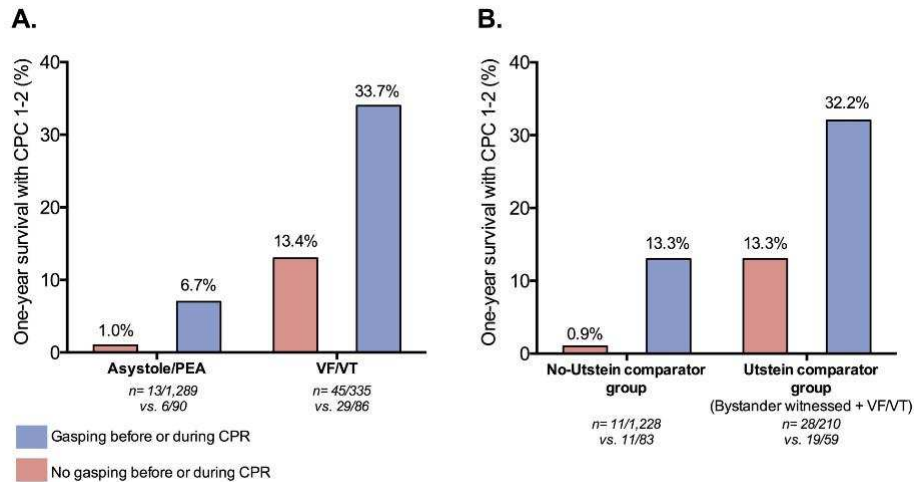
Gasps chez 197/1880 (10.5%)

98 patients ont survécu à un an avec un CPC $\leq$ 2;  
dont 37% (36/98) gasp





## Effet des gasps sur le devenir neurologique à un an



## Effet des gasps sur le devenir neurologique à un an

**TABLE 3** Independent Association of Spontaneous Gasping or Breathing During CPR With 1-Yr Survival With CPC  $\leq 2$  for Out-of-Hospital Cardiac Arrest Patients (n = 1,827)\*

	Adjusted Odds Ratio (95% CI)†
Spontaneous gasping or breathing during CPR	3.94 (2.09–7.44)
Male	1.49 (0.83–2.68)
Age, yrs	0.57 (0.43–0.76)
Pulmonary edema	3.41 (1.53–7.60)
Cardiac arrest witnessed	1.49 (0.76–2.92)
Bystander CPR provision	1.19 (0.68–2.08)
Initial recorded cardiac arrest rhythm, min	
Asystole	1.00
VF or pulseless VT	16.50 (7.40–36.81)
Pulseless electrical activity	1.22 (0.45–3.34)
Emergency call to first response time, min	0.75 (0.51–1.09)
Total CPR duration, min	0.31 (0.19–0.51)
Epinephrine dosage, mg	0.47 (0.25–0.87)



## Gasps et AC

- Gasps = 2<sup>ème</sup> facteur pronostic après FV/TV
- Importance de l'association gasps et FV/TV
- Collecter et reporter systématiquement la présence des gasps dans les études et registres

## Extracorporeal CPR

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**JACC**  
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### ORIGINAL INVESTIGATIONS

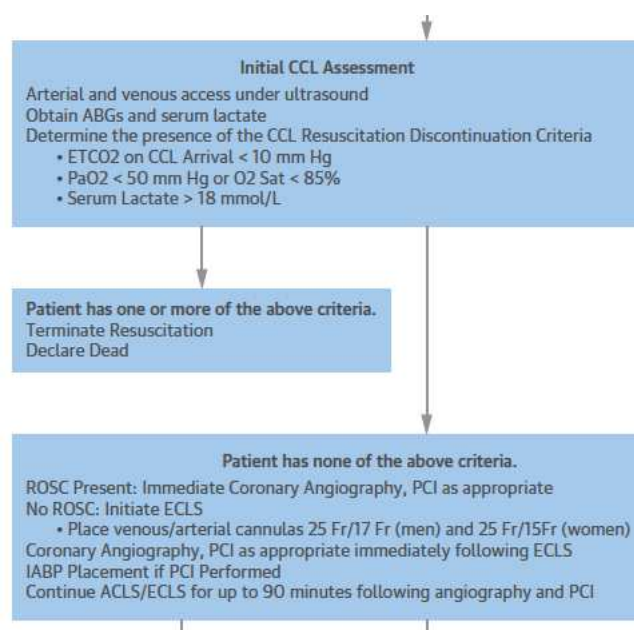
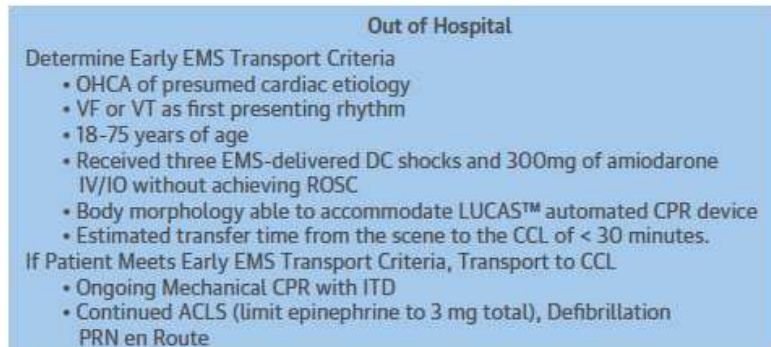
- 1106 Coronary Artery Disease in Patients With Out-of-Hospital Refractory Ventricular Fibrillation Cardiac Arrest  
D. Yannopoulos, T.P. Aufderheide, et al.  
• EDITORIAL: Reinforcing the Links in the Survival Chain  
P.D. Lambiase

### THE PRESENT AND FUTURE

- 1173 STATE-OF-THE-ART REVIEW: Cerebral Amyloid Angiopathy: Diagnosis, Clinical Implications, and Management Strategies  
C.V. DelSanto, D.J. Holmen, Jr., et al.  
1183 REVIEW TOPIC OF THE WEEK: Computer-Interpreted Electrocardiograms: Benefits and Limitations  
S. Chakraborty, H. S. Wadwa, et al.

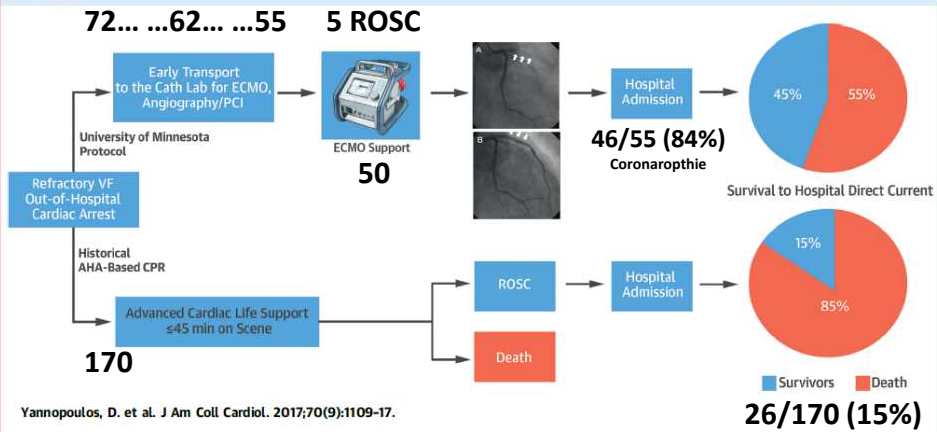


“Coronary Artery Disease in Patients with Out-of-Hospital Refractory Ventricular Fibrillation Cardiac Arrest”

**FIGURE 1 University of Minnesota Refractory VF/VT OHCA Protocol**

# Extracorporeal CPR

**CENTRAL ILLUSTRATION** Refractory Cardiac Arrest Due to VF/VT and the University of Minnesota ECLS/PCI Protocol



**TABLE 3** Resuscitation Characteristics of Survivors and Patients Who Died

Patients With Refractory VF/VT	Survivors (n = 28)	Deaths (n = 34)	p Value
Age, yrs	57 $\pm$ 11	59 $\pm$ 10	0.3
Time from 911 call to first response arrival, min	4.1 $\pm$ 4.6	7.1 $\pm$ 4.6	0.03
Bystander CPR	93	71	0.1
Time from 911 call to CCL entry, min	55 $\pm$ 16.7	62 $\pm$ 14.9	0.07
Time from CCL entry on ECLS, min	6.2 $\pm$ 2	5.8 $\pm$ 3	0.5
ETCO <sub>2</sub> on arrival	42 $\pm$ 15	31 $\pm$ 10	0.04
pH on ECLS opening ABG	7.13 $\pm$ 0.1	7.04 $\pm$ 0.2	0.08
Lactate level at CCL arrival, mmol/l	10.1 $\pm$ 3.9	13.3 $\pm$ 3.3	0.05
Presence of CAD	88	68	0.01
Cardiac arrest witnessed	89	74	0.11

Values are mean  $\pm$  SD or %.

ABG = arterial blood gas; ETCO<sub>2</sub> = end-tidal carbon dioxide; other abbreviations as in Table 1.

## E-CPR

- Bonne selection des patients
- Durée de low-flow cible autour de 60 min
- Bundle de soins optimal (Lucas, Valve d'impedance inspiratoire, PCI, TTM)

## Contrôle Ciblé de la Température

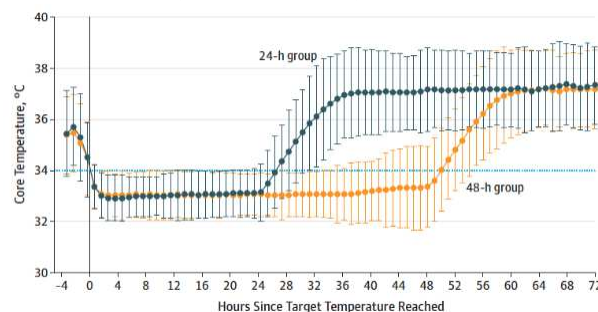
JAMA | **Original Investigation** | CARING FOR THE CRITICALLY ILL PATIENT

### Targeted Temperature Management for 48 vs 24 Hours and Neurologic Outcome After Out-of-Hospital Cardiac Arrest A Randomized Clinical Trial

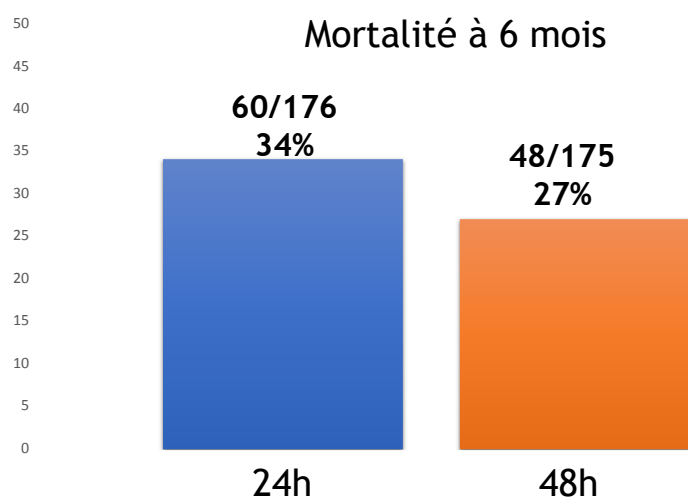
Hans Kirkegaard, MD, PhD, DMSci, DEAA, DLS; Eldar Søreide, MD, PhD, FERC; Inge de Haas, MD; Ville Pettilä, MD, PhD, EDIC; Fabio Silvio Taccone, MD, PhD; Urmet Arus, MD; Christian Storm, MD, PhD; Christian Hassager, MD, DMSc; Jørgen Feldbæk Nielsen, MD, DMSci; Christina Ankjær Sørensen, MD; Susanne Illkjær, MD, PhD; Anni Nørgaard Jeppesen, MD; Anders Morten Grejs, MD, PhD; Christophe Henri Valdemar Duez, MD; Jakob Hjort, MPH; Alf Inge Larsen, MD, PhD, FESC; Valdo Toome, MD; Marjaana Tiainen, MD, PhD; Johanna Hästbacka, MD, PhD; Timo Laitio, MD, PhD; Markus B. Skrifvars, MD, PhD, EDIC, FCICM

## Contrôle Ciblé de la Température

- Étude multicentrique européenne 10 réanimations
- Étude pragmatique 33°C pour 24 ou 48 h
- Puissance calculé pour une différence de 15%
- Prés de 4 à 5h pour la température cible



## CCT 24 vs. 48h



# Head Up CPR

Resuscitation 121 (2017) 195–200



Contents lists available at ScienceDirect

**Resuscitation**

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)



Experimental paper

Head and thorax elevation during active compression decompression cardiopulmonary resuscitation with an impedance threshold device improves cerebral perfusion in a swine model of prolonged cardiac arrest<sup>☆</sup>

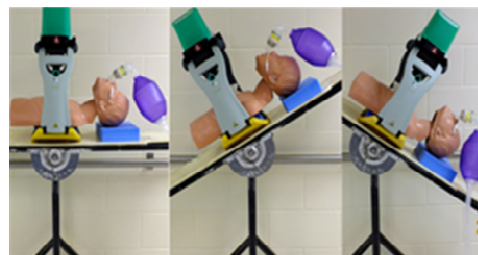


Johanna C. Moore<sup>a,b,\*</sup>, Nicolas Segal<sup>b</sup>, Michael C. Lick<sup>c</sup>, Kenneth W. Dodd<sup>a</sup>, Bayert J. Salverda<sup>a</sup>, Mason B. Hinke<sup>a</sup>, Aaron E. Robinson<sup>a</sup>, Guillaume Debaty<sup>d</sup>, Keith G. Lurie<sup>a,b,e</sup>

## Head Up CPR: Background

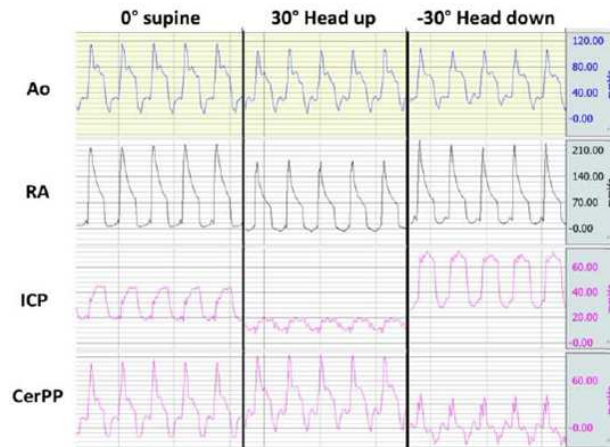
*Whole body* head up tilt in pigs during CPR period of 5 minutes with LUCAS and Impedance Threshold Device (ITD) results in:

1. Higher Cerebral Perfusion Pressure (CerPP)
2. Higher brain blood flow compared to the flat, or supine, position.



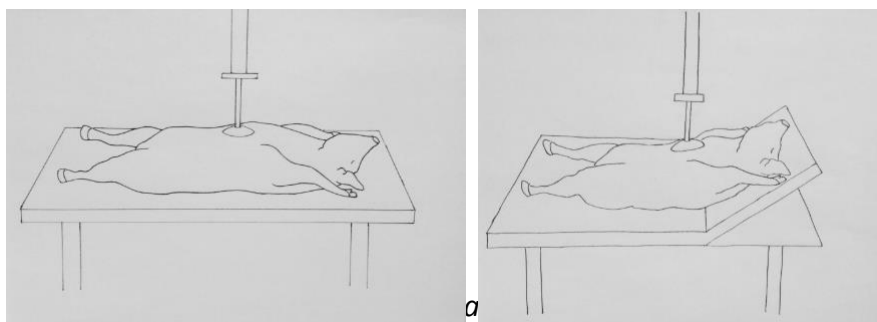
Debaty G, Shin SD, Metzger A, et al. Tilting for perfusion: Head-up position during cardiopulmonary resuscitation improves brain flow in a porcine model of cardiac arrest. *Resuscitation* 2015 Feb;87:38–43.

# Head Up CPR: Background



Debaty G, Shin SD, Metzger A, et al. Tilting for perfusion: Head-up position during cardiopulmonary resuscitation improves brain flow in a porcine model of cardiac arrest. Resuscitation 2015 Feb;87:38-43

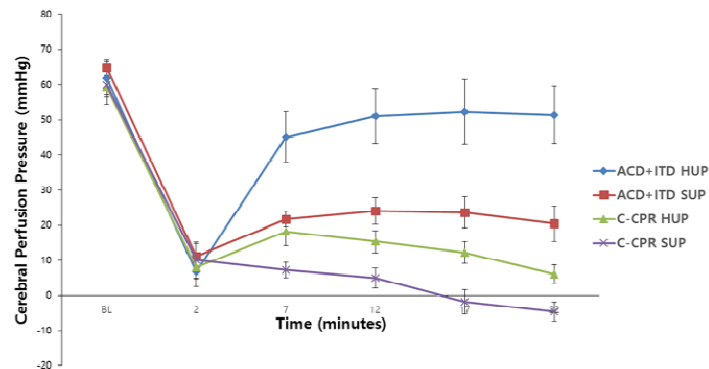
# Head Up CPR: Background



with active compression-decompression (ACD) and ITD results in higher CerPP over 22 minutes of CPR.<sup>2</sup>

Ryu H, Moore J, Yannopoulos D, et al. Elevation of Head and Shoulders Improves Cerebral Perfusion Pressure during Cardiopulmonary Resuscitation in a Porcine Model of Cardiac Arrest. Resuscitation 2016 May;102:29-34





Cerebral Perfusion Pressure = Mean Arterial Pressure- Intracranial Pressure

ACD: Active Compression Decompression CPR

ITD: Impedance Threshold Device

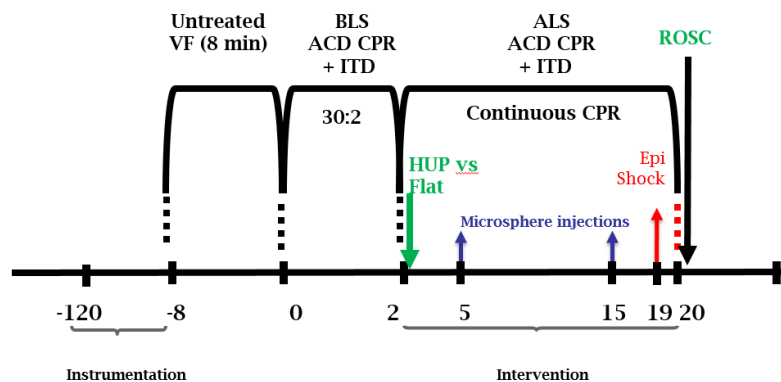
SUP: Supine Position

HUP: Head Up Position

C-CPR: Conventional, or standard, CPR

Ryu HH, Moore JC, Yannopoulos D, Lick M, McKnite S, Shin SD, Kim TY, Metzger A, Rees J, Tsangaris A, Debaty G, Lurie KG. The effect of head up cardiopulmonary resuscitation on cerebral and systemic hemodynamics. Resuscitation. 2016;102:29-34

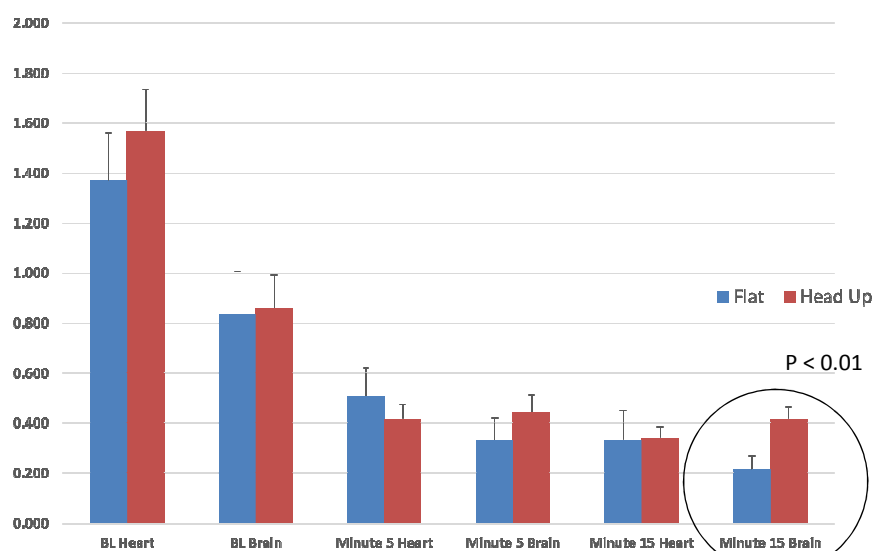
## Methods: Study Protocol



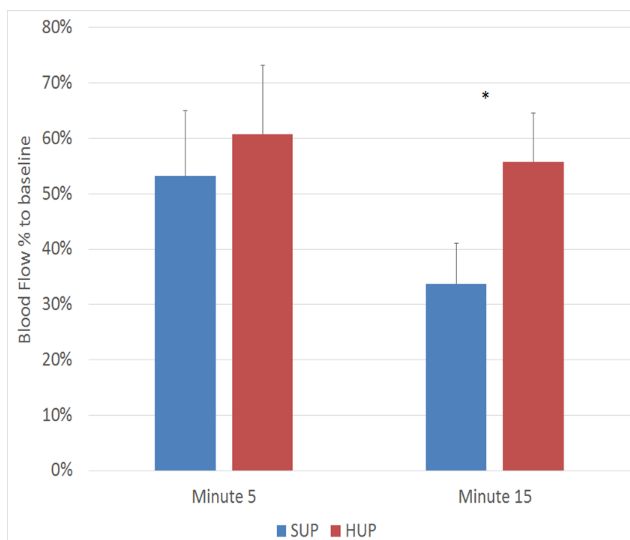
## Results: Blood Flow

- 10 animals in the flat group and 8 in the Head Up group studied
- Primary Endpoint: Cerebral blood flow was *double* in the Head Up group ( $0.42 \pm 0.05$  mg/min/g) versus the flat group ( $0.21 \pm 0.04$ ) at 15 minutes.
- Secondary Endpoints:
  - Cerebral Perfusion Pressure was higher in the Head Up Group at 20 minutes.
  - Intracranial Pressure was lower in the Head Up Group at 20 minutes.

## Results: Flat Versus Head Up CPR Cerebral and Cardiac Blood Flow

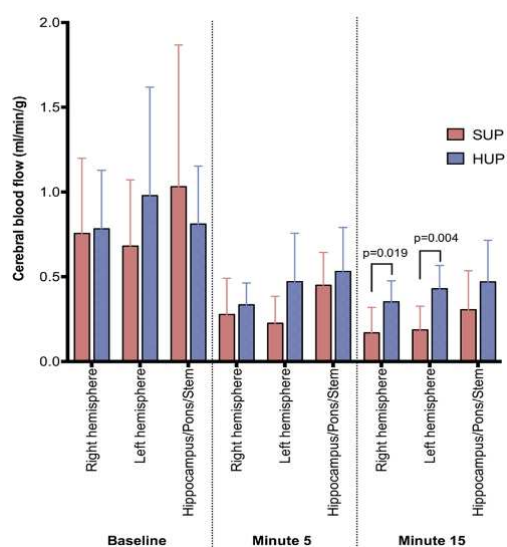


## Brain Blood Flow: % of Baseline after 5 and 15 minutes of CPR



SUP = Supine  
HUP = Head Up  
\*  $P < 0.01$

## Regional Brain Blood Flow



## Head-up CPR - conclusions

- Débit sanguin cérébral est doublé après 15 min de comparé à une RCP à plat
- Pression intracrânienne est abaissée et la pression de perfusion cérébrale augmentée comparée à une RCP à plat après 20 min de RCP
- C'est résultats sont en faveur d'une évaluation clinique chez l'homme de l'impact de la RCP tête surélevée

## Conclusion

- T-RCP et ↑ RCP par les témoins = priorité pour améliorer la survie avec bon devenir neurologique des patients
- Ne pas abandonner quand Gasps + FV
- Revoir la stratégie pour l'ECPR
- Pistes de recherche et des résultats prometteurs