GUIDELINES 2025

EUROPEAN RESUSCITATION COUNCIL©

Arrêt Cardiaque et Hypothermie Accidentelle

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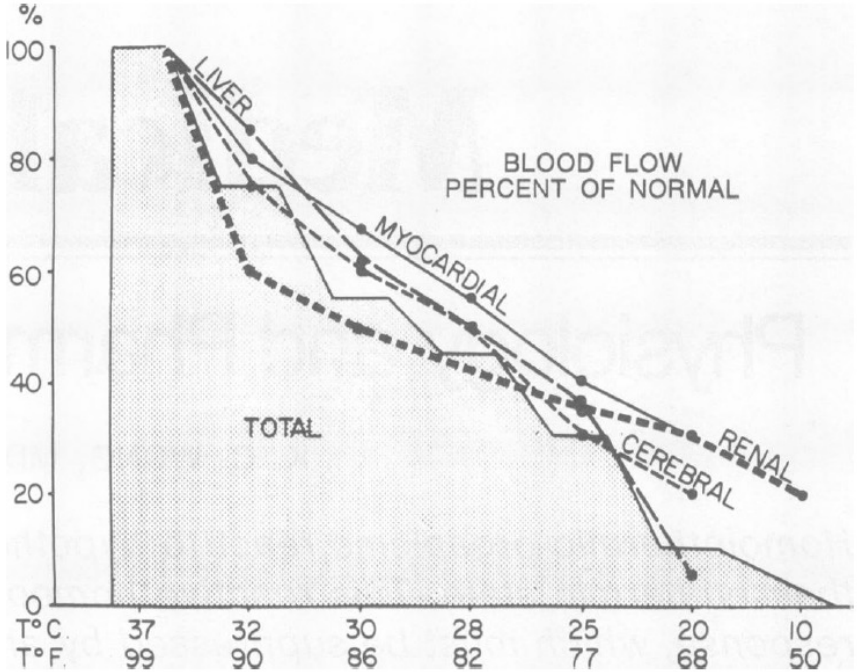
CHU GRENOBLE ALPES

Effets métaboliques

Débit sanguin au niveau des différents organes en fonction de la température. Clinical hypothermia par E. Blair. 1964 McGraw-Hill

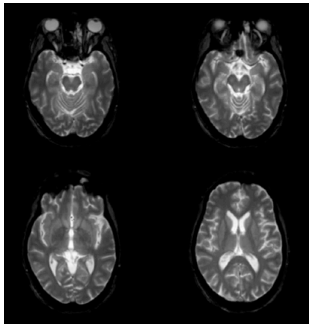


$ETCO_2$ n'est pas pronostic en hypothermie

Neurologic Recovery From Profound Accidental Hypothermia After 5 Hours of Cardiopulmonary Resuscitation

Yvonnick Boue, MD[1,2,3]; Julien Lavolaine, MD[1]; Pierre Bouzat, MD, PhD[1,2,3]; Sophie Matraxia, MD[4]; Olivier Chavanon, MD, PhD[3]; Jean-François Payen, MD, PhD[1,2,3]

Crit Care Med. 2014;42:e167-70.



Femme 55 ans, épuisement dans la tempête en montagne.

Risque avalanche ++

Arrivée des secours : signes de vie puis AC en FV

CEE / Adrénaline (IO)

Alternance RCP (1 min) / No flow pour descente (1 min) jusqu'à l'ambulance

Total no flow 12 - 13 min

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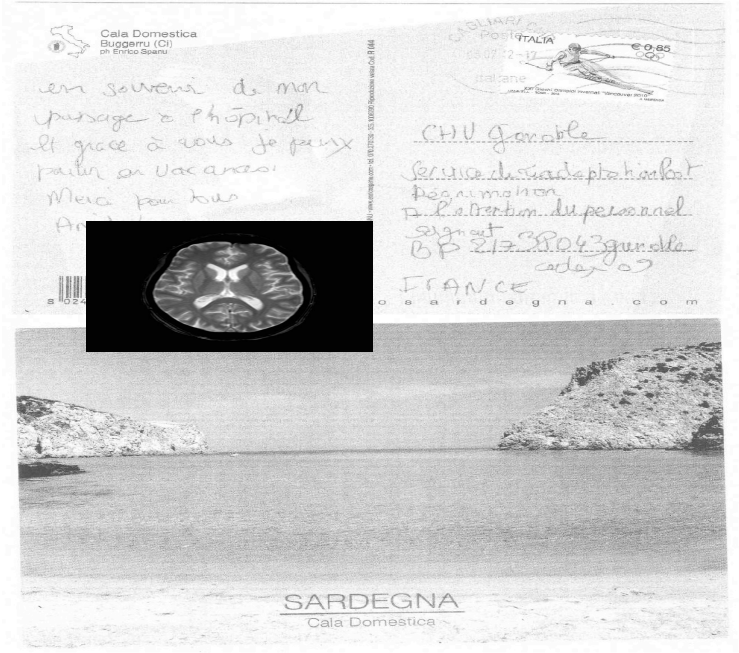

Prise en charge préhospitalière (2)

- IOT
- MCE + MC automatisé
- T° : 16,7° c
- EtCO2 : 19 mmHg
- 3 h de route jusqu'au CHU, Intermitent CPR :
- **Total low flow 5 h**

Prise en charge hospitalière :

- ECMO (AV)
- T° centrale : 16,3° C
- K+ : 5.8 mmol/l
- Pas de trauma

2 mois en réanimation

3 mois en centre de rééducation neurologique

Pas de limite de durée de Low Flow si Hypothermie accidentelle à l'origine d'un AC

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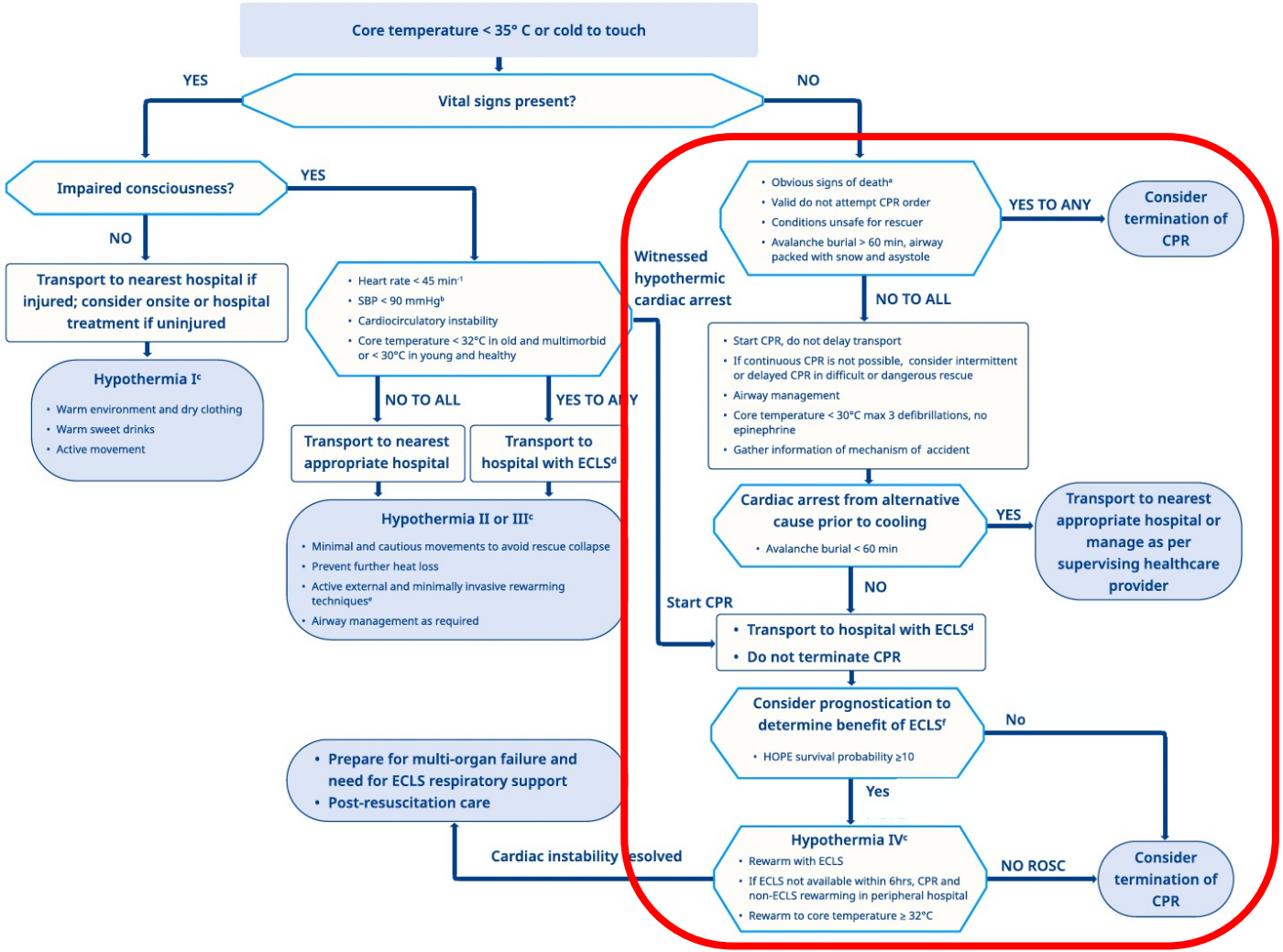
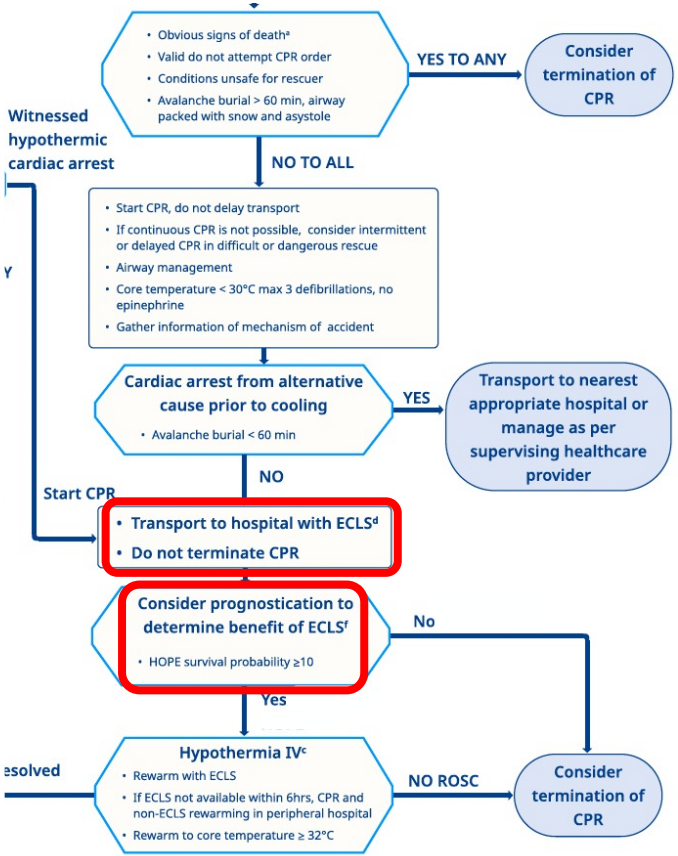


En pratique



The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

CURRENT CONCEPTS

Accidental Hypothermia

Douglas J.A. Brown, M.D., Hermann Brugger, M.D., Jeff Boyd, M.B., B.S., and Peter Paal, M.D.

N ENGL J MED 367;20 NEJM.ORG NOVEMBER 15, 2012

HT IV : État de mort apparent

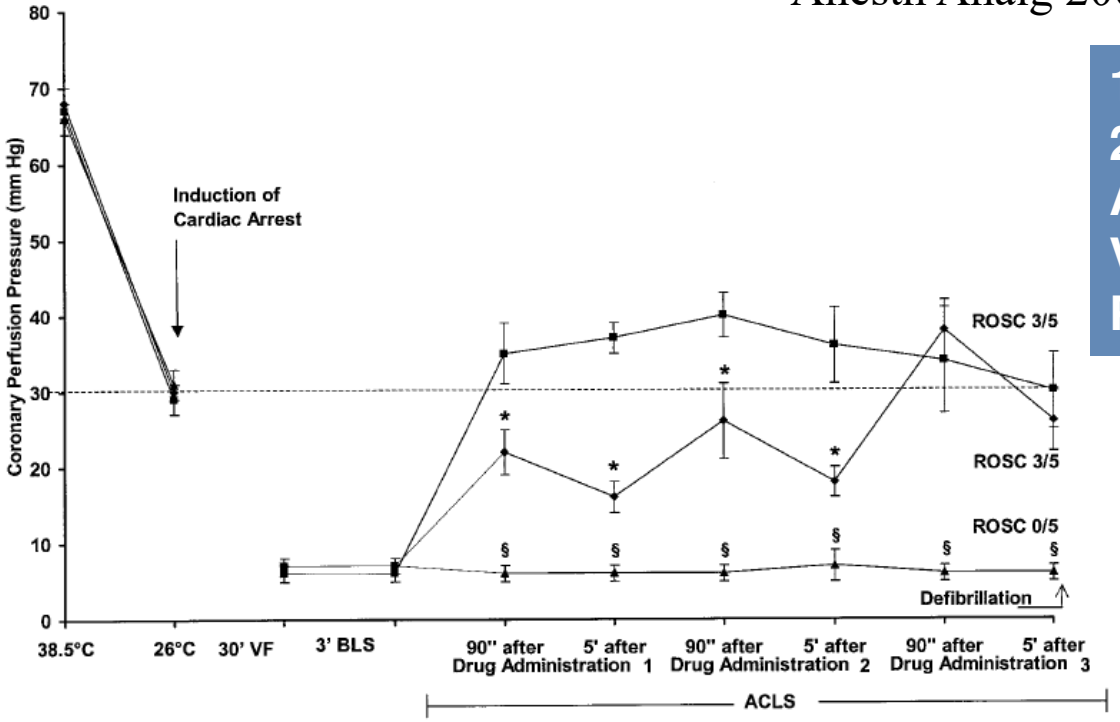
1. Confirmer AC (1 min d'enregistrement ECG)
2. Critères de non réanimation :
   - Risques objectifs
   - Corps gelé
3. RCP + 3 CEE max + 1 mg adrénaline max si délai pour accès ECPR
4. Transfert vers centre ECPR
   - Triage : Hope Score

Drogues et hypothermie

Cardiopulmonary Resuscitation During Severe Hypothermia in Pigs: Does Epinephrine or Vasopressin Increase Coronary Perfusion Pressure?

Anette C. Krismer, MD*, Karl H. Lindner, MD*, Roselies Kornberger, MD*, Volker Wenzel, MD*, Goetz Mueller, BS*, Wolfgang Hund, BS*, Stephan Oroszy, MD*, Keith G. Lurie, MD†, and Peter Mair, MD*

Anesth Analg 2000;90:69–73



15 cochons :
26,5° C
Adrénaline
Vasopressine
Placebo

Drogues et hypothermie

International Journal of Environmental Research and Public Health

MDPI

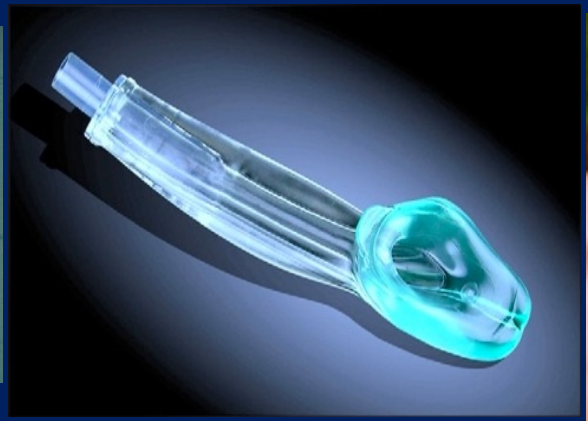
Article

Successful Pre-Rewarming Resuscitation after Cardiac Arrest in Severe Hypothermia: A Retrospective Cohort Study from the International Hypothermia Registry

Evelien Cools [1,*], Marie Meyer [2], Delphine Courvoisier [3] and Beat Walpoth [4]

	Initial Rhythm	CPR Duration (min)	Rhythm after ROSC	Defibrillation?-Successful?-Number of Shocks	Adrenaline (IV)	Response Rate
1	VF	U	Sinus	Y-N-1	Adrenaline	U
2	VF	U	Sinus	Y-Y-1	U	U
3	VF	5	Sinus	N	N	
4	PEA	35	U	N	Adrenaline 2.4 mg	Normal
5	PEA	12	Sinus	N	N	
6	VF	U	AF	Y-Y-2	Adrenaline 1 mg (3x) Adrenaline 0.1 mg (5x)	Normal
7	Asystole	20	Sinus	N	Adrenaline 4.5 mg Adrenaline 0.1 mg (5x)	U Normal
8	PEA	15	Sinus	N	N	
9	PEA	U	U	Y-Y-4	Adrenaline 3 mg	Normal
10	Asystole	29	Sinus	N	Adrenaline 5 mg	Normal
11	VF	35	Sinus	Y-Y-3	Adrenaline 1 mg (5x)	U
12	PEA	21	AF	N	N	N
13	Asystole	30	Sinus	N	Adrenaline 3 mg	Normal
14	PEA	10	Sinus	N	U	U

Comment Contrôler les voies aériennes



JAMA | Original Investigation

Effect of a Strategy of a Supraglottic Airway Device vs Tracheal Intubation During Out-of-Hospital Cardiac Arrest on Functional Outcome

The AIR

Jonathan R. Beng
Jerry P. Nolan, ME
Elizabeth A. Stoke

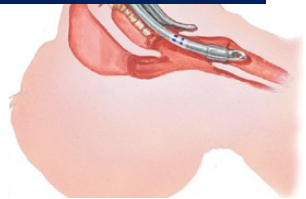
JAMA | Original Investigation

Effect of a Strategy of Initial Laryngeal Tube Insertion vs Endotracheal Intubation on 72-Hour Survival in Adults With Out-of-Hospital Cardiac Arrest

JAMA
Eff
Du
Ou

A Randomized Clinical Trial

Patricia Jabre, MD, PhD; Andrea Penaloza, MD, PhD; David Pinero, MD; Francois-Xavier Duchateau, MD; Stephen W. Borron, MD, MS; Francois Javaudin, MD; Olivier Richard, MD; Diane de Longueville, MD; Guillem Bouilleau, MD; Marie-Laure Devaud, MD; Matthieu Heidet, MD, MPH; Caroline Lejeune, MD; Sophie Fauroux, MD; Jean-Luc Greingor, MD; Alessandro Manara, MD; Jean-Christophe Hubert, MD; Bertrand Guihard, MD; Olivier Vermylen, MD; Pascale Lievens, MD; Yannick Auffret, MD; Celine Maisondieu, MD; Stephanie Huet, MD; Benoît Claessens, MD; Frederic Lapostolle, MD, PhD; Nicolas Javaud, MD, PhD; Paul-Georges Reuter, MD, MS; Elinor Baker, MD; Eric Vicaut, MD, PhD; Frédéric Adnet, MD, PhD



RESUSCITATION 186 (2023) 109769

Available online at ScienceDirect

Resuscitation

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

EUROPEAN RESUSCITATION COUNCIL

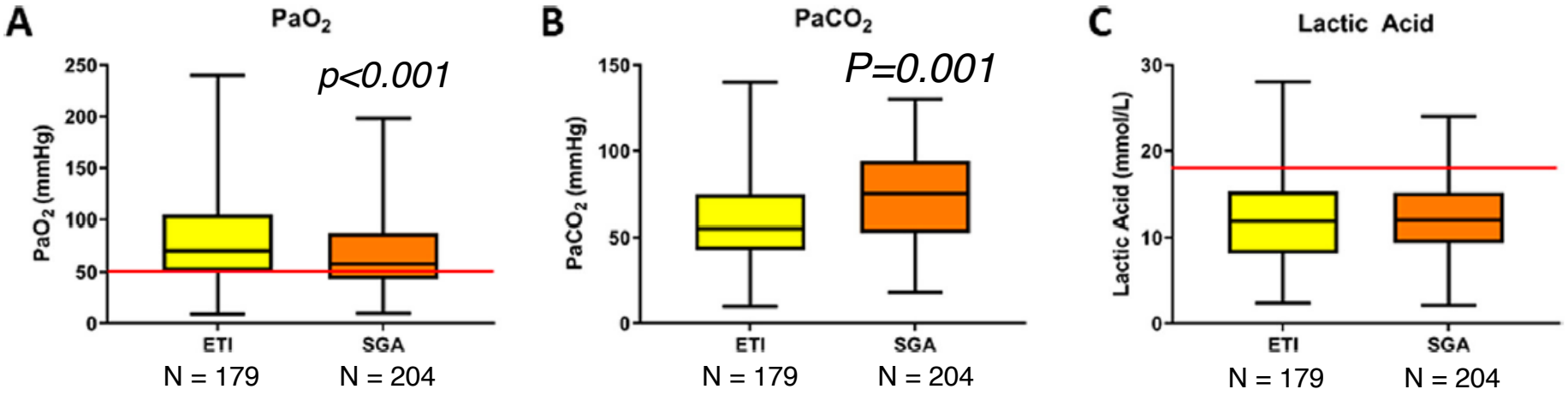
AC réfractaire et contrôle voies aériennes

Clinical paper

Supraglottic airway devices are associated with asphyxial physiology after prolonged CPR in patients with refractory Out-of-Hospital cardiac arrest presenting for extracorporeal cardiopulmonary resuscitation

Jason A. Bartos[a,b,], Arianne Clare Agdamag[a], Rajat Kalra[a], Lindsay Nutting[a],*

383 patients with RCA treated with ECPR



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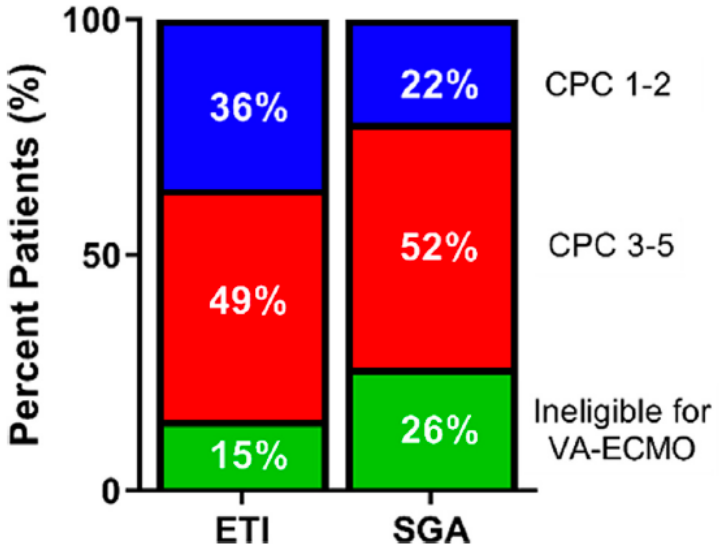


P=0.02 for favorable neurologic outcome

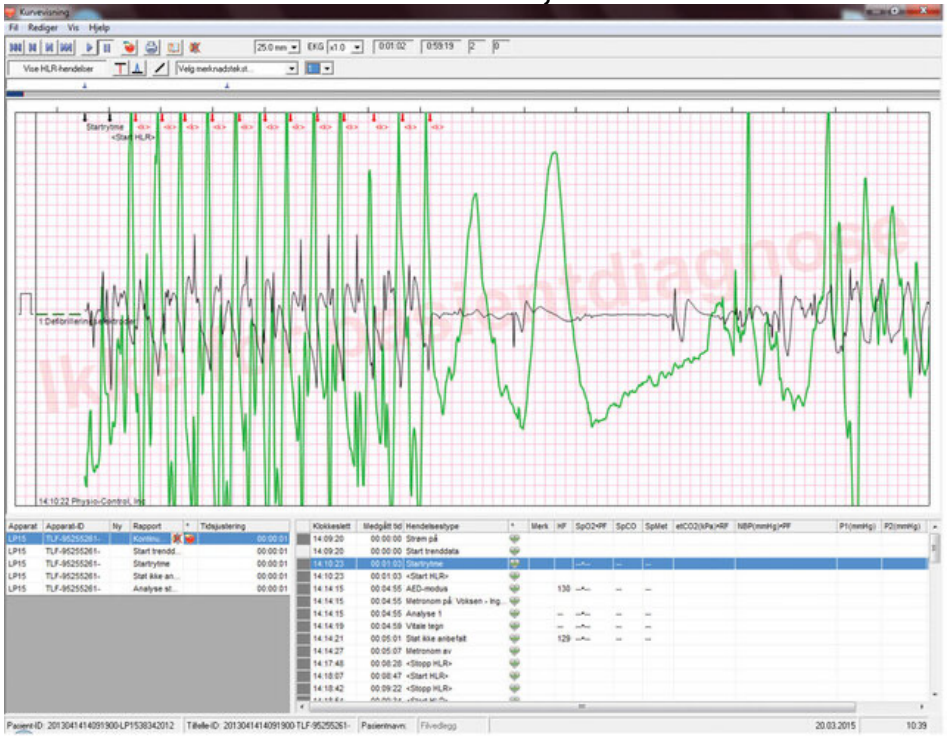
53 patients (26%) with SGA vs. 23 (12.8%) with ETI excluded to ECPR due to PaO2<50mmHg, p<0.001

Ventilation manuelle et RCP

Bag-Valve-Mask Ventilation and Survival From Out-of-Hospital Cardiac Arrest: A Multicenter Study

Ahamed H. Idris, MD; Elisabete Aramendi Ecenarro, PhD; Brian Leroux, PhD; Xabier Jaureguibeitia, MSc; Betty Y. Yang, MD, MS; Sarah Shaver, MD; Mary P. Chang, MD, MPH; Tom Rea, MD, MPH; Peter Kudenchuk, MD; Jim Christenson, MD; Christian Vaillancourt, MD, MSc; Clifton Callaway, MD, PhD; David Salcido, PhD; Jonas Carson; Jennifer Blackwood, MPH; Henry E. Wang, MD, MS, MPH

Circulation. 2023;148:1847–1856.



1976 tracing with 30:2

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< 50% effective ventilation

> 50% effective ventilation

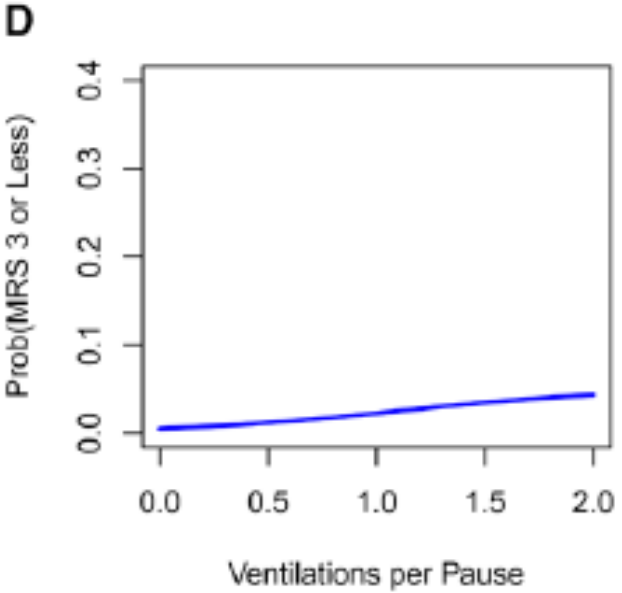
2.4%

N=28/1177

Risk Ratio
2.8 (1.8-4.3)
P<0.001

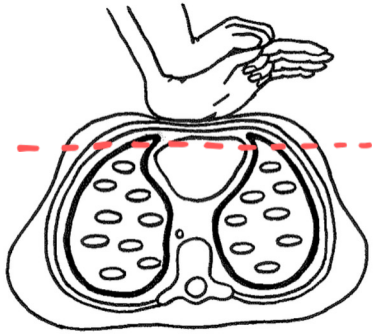
10.6%

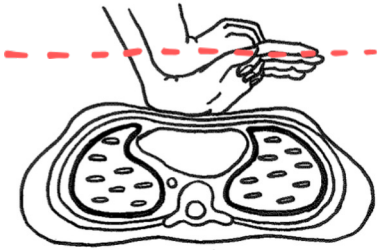
N=84/799



Volume thoracique et RCP

Volume pulmonaire en fin d'expériation

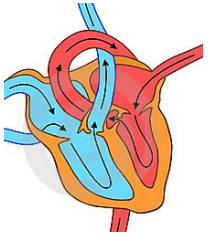


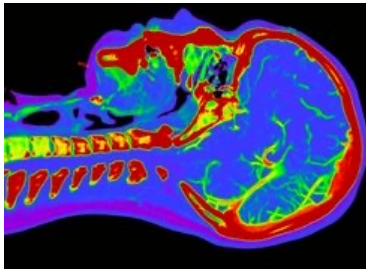


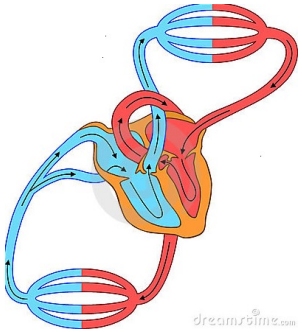
Distension thoracique

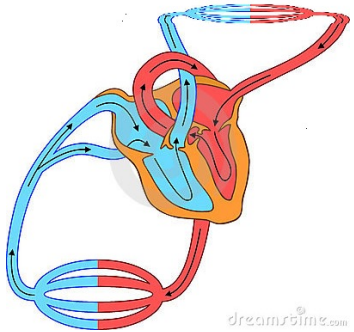
Volume adéquate

Fermeture des voies aériennes

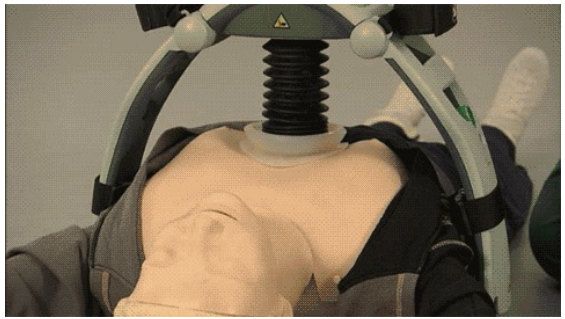








Optimiser la ventilation avec un respirateur pendant le transport per RCP



+

=

↘ V_T

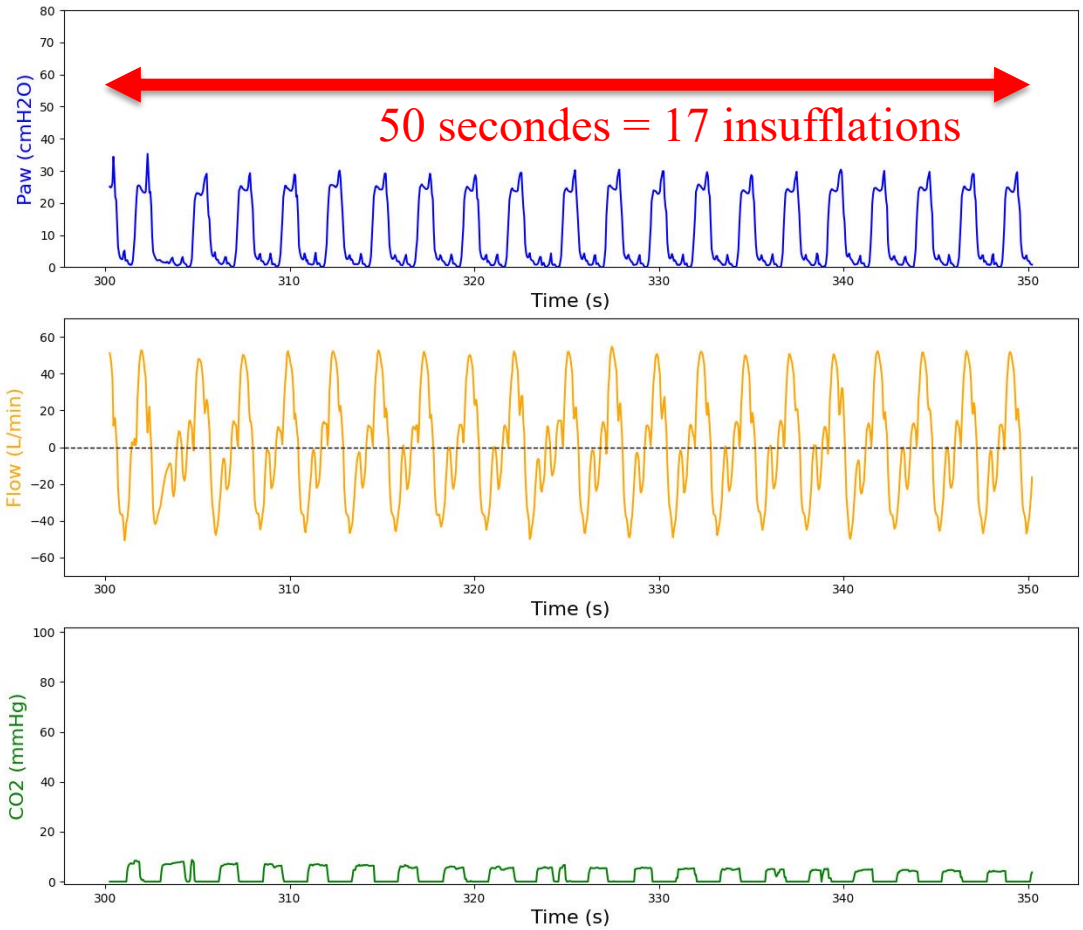
↗ $P_{peak\ airway\ pressure}$ > P_{max}

Ventilation assitée innapropriée

Bien régler son respirateur pour éviter les échecs de ventilation

Mauvais réglage:
Insp Trigger On
avec FR 10/min

Pression Positive
intrathoracique
> 60% du temps



Ma RESPIRATORY CARE

Mechanical Ventilation Management During Mechanical Chest Compressions

Daniele Orso, Luigi Vetrugno, Nicola Federici, Matteo Borselli, Savino Spadaro, Gianmaria Cammarota and Tiziana Bove

Respiratory Care February 2021, 66 (2) 334-346; DOI: https://doi.org/10.4187/respcare.07775

Control Ventilation mode

V_T

6 – 8 mL/kg de PIT

RR

10 / min

PEEP

0 - 5 cmH_2O

Insp Trigger

OFF

P_{max}

60 cmH_2O

I : E

1 : 5

FiO_2

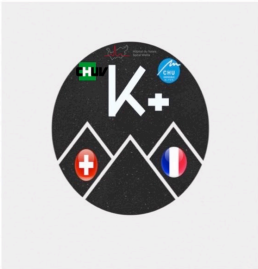
100 %

Le triage Intra Hospitalier

Le potassium était le seul critère validé pour le triage

[K+] > 12 mmol.l^{-1} = Arrêt de la réanimation (8 mmol.l^{-1} pour l'avalanché)

Attention pas d'accord sur la technique de mesure !



Hilmo et al.
Resuscitation 2016

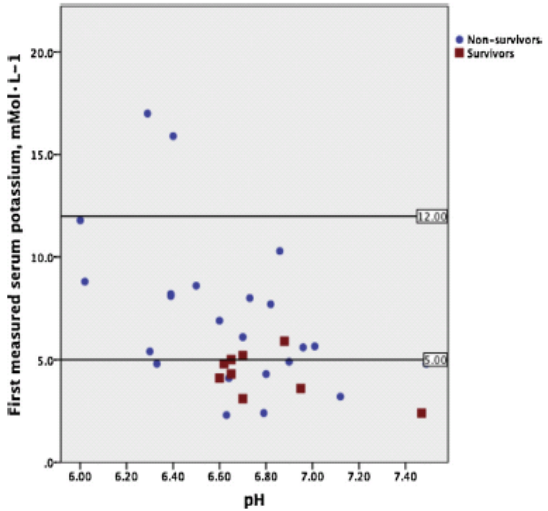


Fig. 4. Distribution of pH and serum potassium concentrations between 34 survivors and non-survivors with accidental hypothermic cardiac arrest admitted to the University Hospital of North Norway (UNN Tromsø) during 1985–2013.

ECPR et hypothermie accidentelle

Resuscitation 126 (2018) 58–64

Contents lists available at ScienceDirect

Resuscitation

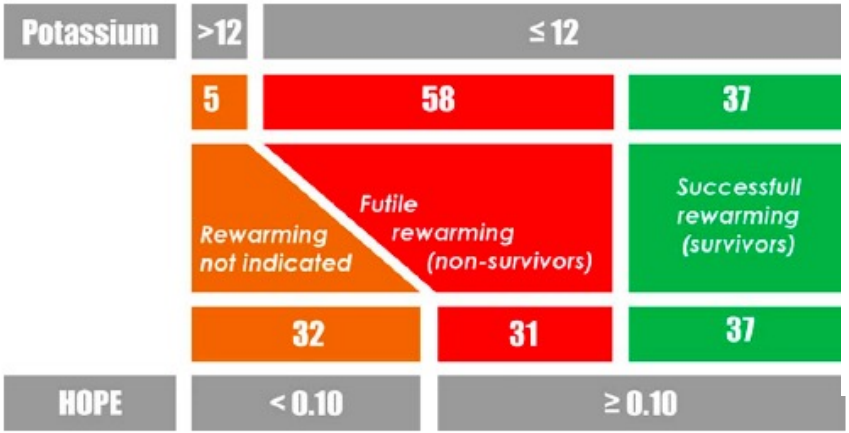
journal homepage: www.elsevier.com/locate/resuscitation

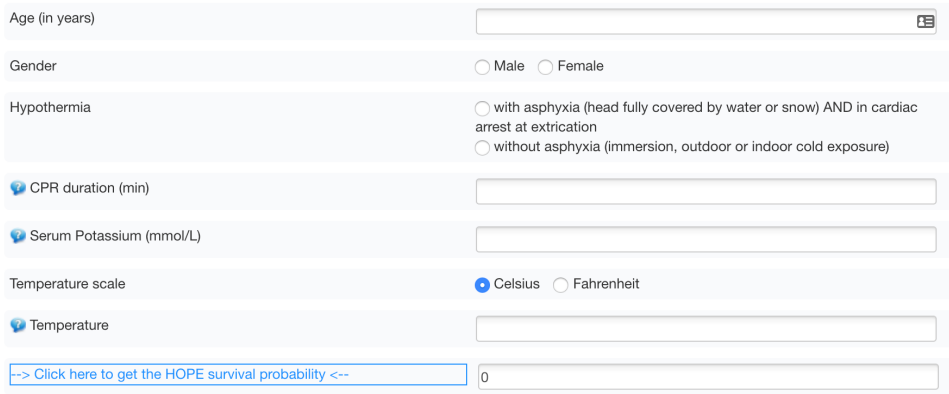
Clinical paper

Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: The HOPE score☆

Mathieu Pasquier[a,*], Olivier Hugli[a], Peter Paal[b], Tomasz Darocha[c], Marc Blancher[d], Paul Husby[e], Tom Silfvast[f], Pierre-Nicolas Carron[a], Valentin Rousson[g]

http://www.hypothermiascore.org/





Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: An external validation of the HOPE score. Resuscitation 2019

Conclusion

- Hors traumatisme l'hypothermie est un facteur de bon pronostic
- Pas de risque d'AC si t° > 30° ou GCS > 10
- Ne pas abandonner quand hypothermie avec AC devant témoin
- ECPR traitement de référence de l'hypothermie stade IV

never give in, never give in, never, never, never…

Winston Churchil, 1941