

## FV

*Una major elevació de l'ST prèvia a la reperfusió és un marcador de risc de FV durant la ICP. I a més, els pacients que fibril·len durant la reperfusió tenen una major mortalitat intrahospitalària que els que no.*

**Am J Cardiol.** 2014 Nov 29. pii: S0002-9149(14)02166-3. doi: 10.1016/j.amjcard.2014.11.025. [Epub ahead of print]

### **Predictors of Ventricular Fibrillation at Reperfusion in Patients With Acute ST-Elevation Myocardial Infarction Treated by Primary Percutaneous Coronary Intervention.**

Demidova MM1, Carlson J2, Erlinge D2, Platonov PG2.

Author information<sup>1</sup>Department of Cardiology, Lund University, Lund, Sweden; Federal Medical Research Center, St. Petersburg, Russia. Electronic address: [marina.demidova@med.lu.se](mailto:marina.demidova@med.lu.se).<sup>2</sup>Department of Cardiology, Lund University, Lund, Sweden.

#### **Abstract**

Ventricular fibrillation (VF) during reperfusion (rVF) in ST-segment elevation myocardial infarction (STEMI) is an infrequent but serious event that complicates coronary interventions. The aim of this study was to analyze clinical predictors of rVF in an unselected population of patients with STEMI treated with percutaneous coronary intervention (PCI). Consecutive patients with STEMI admitted to a tertiary care hospital for primary PCI from 2007 to 2012 were retrospectively assessed for the presence of rVF. Admission electrocardiograms, stored in a digital format, were analyzed for a maximal ST-segment elevation in a single lead and the sum of ST-segment deviations in all leads. Clinical, electrocardiographic, and angiographic characteristics were tested for associations with rVF using logistic regression analysis. Among 3,724 patients with STEMI admitted from 2007 to 2012, 71 (1.9%) had rVF. In univariate analysis, history of myocardial infarction, aspirin and  $\beta$ -blocker use, VF before PCI, left main coronary artery disease, inferior myocardial infarction localization, symptom-to-balloon time <360 minutes, maximal ST-segment elevation in a single lead >300  $\mu$ V, and sum of ST-segment deviations in all leads >1,500  $\mu$ V were associated with increased risk for rVF. In a multivariate analysis, sum of ST-segment deviations in all leads >1500  $\mu$ V (odds ratio 3.7, 95% confidence interval 1.45 to 9.41,  $p = 0.006$ ) before PCI remained an independent predictor of rVF. In-hospital mortality was 18.3% in the rVF group and 3.3% in the group without VF ( $p < 0.001$ ), but rVF was not an independent predictor of in-hospital death. In conclusion, the magnitude of ST-segment elevation before PCI for STEMI independently predicts rVF and should be considered in periprocedural arrhythmic risk assessment. Despite higher in-hospital mortality in patients with rVF, rVF itself has no independent prognostic value for prognosis.

## **REGISTRES I REVISIONS**

*Als USA no tenen gaire clar com fer RCP...*

**J Intensive Care Med.** 2014 Dec 25. pii: 0885066614561589. [Epub ahead of print]

### **When to Stop CPR and When to Perform Rhythm Analysis: Potential Confusion Among ACLS Providers.**

Giberson B1, Uber A1, Gaieski DF2, Miller JB3, Wira C4, Berg K5, Giberson T1, Cocchi MN6, Abella BS2, Donnino MW7.

Author information<sup>1</sup>Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA, USA.<sup>2</sup>Department of Emergency Medicine, Hospital of University of Pennsylvania, Philadelphia, PA, USA.<sup>3</sup>Henry Ford Hospital, Detroit, MI, USA.<sup>4</sup>Yale School of Medicine, Department of Emergency Medicine, New Haven, CT, USA.<sup>5</sup>Department of Medicine, Division of Pulmonary, Critical Care, Beth Israel Deaconess Medical Center, Boston,

MA, USA.6Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA, USA Department of Anesthesia Critical Care, Beth Israel Deaconess Medical Center, Boston, MA, USA.7Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA, USA Department of Medicine, Division of Pulmonary, Critical Care, Beth Israel Deaconess Medical Center, Boston, MA, USA [mdonnino@bidmc.harvard.edu](mailto:mdonnino@bidmc.harvard.edu).

#### **Abstract**

**BACKGROUND:** Health care providers nationwide are routinely trained in Advanced Cardiac Life Support (ACLS), an American Heart Association program that teaches cardiac arrest management. Recent changes in the ACLS approach have de-emphasized routine pulse checks in an effort to promote uninterrupted chest compressions. We hypothesized that this new ACLS algorithm may lead to uncertainty regarding the appropriate action following detection of a pulse during a cardiac arrest.

**METHODS:** We conducted an observational study in which a Web-based survey was sent to ACLS-trained medical providers at 4 major urban tertiary care centers in the United States. The survey consisted of 5 multiple-choice, scenario-based ACLS questions, including our question of interest. Adult staff members with a valid ACLS certification were included.

**RESULTS:** A total of 347 surveys were analyzed. The response rate was 28.1%. The majority (53.6%) of responders were between 18 and 32 years old, and 59.9% were female. The majority (54.2%) of responders incorrectly stated that they would continue CPR and possibly administer additional therapies when a team member detects a pulse immediately following defibrillation. Secondarily, only 51.9% of respondents correctly chose to perform a rhythm check following 2 minutes of CPR. The other 3 survey questions were correctly answered an average of 89.1% of the time.

**CONCLUSION:** Confusion exists regarding whether or not CPR and cardiac medications should be continued in the presence of a pulse. Education may be warranted to emphasize avoiding compressions and medications when a palpable pulse is detected.

*Sobre una regla per para la RCP en RCP bàsica (a Seul)*

*J Korean Med Sci.* 2015 Jan;30(1):104-109. Epub 2014 Dec 23.

#### **The Scene Time Interval and Basic Life Support Termination of Resuscitation Rule in Adult Out-of-Hospital Cardiac Arrest.**

Kim TH<sup>1</sup>, Shin SD<sup>2</sup>, Kim YJ<sup>2</sup>, Kim CH<sup>3</sup>, Kim JE<sup>1</sup>.

Author information<sup>1</sup>Laboratory of Emergency Medical Services, Seoul National University Hospital Biomedical Research Institute, Seoul, Korea.<sup>2</sup>Department of Emergency Medicine, Seoul National University College of Medicine, Seoul, Korea.<sup>3</sup>Department of Emergency Medicine, Inje University College of Medicine, Seoul, Korea.

#### **Abstract**

We validated the basic life support termination of resuscitation (BLS TOR) rule retrospectively using Out-of-Hospital Cardiac Arrest (OHCA) data of metropolitan emergency medical service (EMS) in Korea. We also tested it by investigating the scene time interval for supplementing the BLS TOR rule. OHCA database of Seoul (January 2011 to December 2012) was used, which is composed of ambulance data and hospital medical record review. EMS-treated OHCA and 19 yr or older victims were enrolled, after excluding cases occurred in the ambulance and with incomplete information. The primary and secondary outcomes were hospital mortality and poor neurologic outcome. After calculating the sensitivity (SS), specificity (SP), and the positive and negative predictive values (PPV and NPV), tested the rule according to the scene time interval group for sensitivity analysis. Of total 4,835 analyzed patients, 3,361 (69.5%) cases met all 3 criteria of the BLS TOR rule. Of these, 3,224 (95.9%) were dead at discharge (SS,73.5%; SP,69.6%; PPV,95.9%; NPV, 21.3%) and 3,342 (99.4%) showed poor neurologic outcome at discharge (SS, 75.2%; SP, 89.9%; PPV, 99.4%; NPV, 11.5%). The cut-off scene time intervals for 100% SS and PPV were more than 20 min for survival to discharge and more than 14 min for

good neurological recovery. The BLS TOR rule showed relatively lower SS and PPV in OHCA data in Seoul, Korea.

*Epidemiologia de la mort sobtada a Korea*

*J Korean Med Sci.* 2015 Jan;30(1):95-103. Epub 2014 Dec 23.

**Epidemiology and Outcomes in Out-of-hospital Cardiac Arrest: A Report from the NEDIS-Based Cardiac Arrest Registry in Korea.**

Yang HJ1, Kim GW2, Kim H3, Cho JS4, Rho TH5, Yoon HD6, Lee MJ7; The NEDIS-CA Consortium. Author information1The ACLS Committee of the Korean Association of Cardiopulmonary Resuscitation, Seoul, Korea. ; Department of Emergency Medicine, Gachon University Gill Hospital, Incheon, Korea.2The ACLS Committee of the Korean Association of Cardiopulmonary Resuscitation, Seoul, Korea. ; Department of Emergency Medicine, School of Medicine, Ajou University, Suwon, Korea.3The ACLS Committee of the Korean Association of Cardiopulmonary Resuscitation, Seoul, Korea. ; Department of Emergency Medicine, Wonju College of Medicine, Yonsei University, Wonju, Korea.4Department of Emergency Medicine, Gachon University Gill Hospital, Incheon, Korea.5The ACLS Committee of the Korean Association of Cardiopulmonary Resuscitation, Seoul, Korea. ; Division of Cardiology, Department of Medicine, College of Medicine, The Catholic University of Korea, Seoul, Korea.6National Emergency Medical Center, Seoul, Korea.7The ACLS Committee of the Korean Association of Cardiopulmonary Resuscitation, Seoul, Korea. ; Department of Emergency Medicine, School of Medicine, Kyungpook National University, Daegu, Korea.

**Abstract**

Sudden cardiac death (SCD) is a significant issue affecting national health policies. The National Emergency Department Information System for Cardiac Arrest (NEDIS-CA) consortium managed a prospective registry of out-of-hospital cardiac arrest (OHCA) at the emergency department (ED) level. We analyzed the NEDIS-CA data from 29 participating hospitals from January 2008 to July 2009. The primary outcomes were incidence of OHCA and final survival outcomes at discharge. Factors influencing survival outcomes were assessed as secondary outcomes. The implementation of advanced emergency management (drugs, endotracheal intubation) and post-cardiac arrest care (therapeutic hypothermia, coronary intervention) was also investigated. A total of 4,156 resuscitation-attempted OHCA were included, of which 401 (9.6%) patients survived to discharge and 79 (1.9%) were discharged with good neurologic outcomes. During the study period, there were 1,662,470 ED visits in participant hospitals; therefore, the estimated number of resuscitation-attempted CAs was 1 per 400 ED visits (0.25%). Factors improving survival outcomes included younger age, witnessed collapse, onset in a public place, a shockable rhythm in the pre-hospital setting, and applied advanced resuscitation care. We found that active advanced multidisciplinary resuscitation efforts influenced improvement in the survival rate. Resuscitation by public witnesses improved the short-term outcomes (return of spontaneous circulation, survival admission) but did not increase the survival to discharge rate. Strategies are required to reinforce the chain of survival and high-quality cardiopulmonary resuscitation in Korea.

*Sobre els factors que s'associen a una major taxa de ressuscitació. Els que ja sabíem més o menys, però ara ens ho diuen des de Copenhagen.*

*Ann Emerg Med.* 2014 Dec 24. pii: S0196-0644(14)01577-7. doi: 10.1016/j.annemergmed.2014.12.009. [Epub ahead of print]

**Factors Associated With Successful Resuscitation After Out-of-Hospital Cardiac Arrest and Temporal Trends in Survival and Comorbidity.**

Søholm H1, Hassager C2, Lippert F3, Winther-Jensen M2, Hartvig-Thomsen J2, Friberg H4, Bro-Jepsen J2, Køber L2, Kjaergaard J2.

Author information<sup>1</sup>Department of Cardiology, the Heart Centre, Copenhagen University Hospital Rigshospitalet, Copenhagen, Denmark. Electronic address: [helle.soholm@gmail.com](mailto:helle.soholm@gmail.com).<sup>2</sup>Department of Cardiology, the Heart Centre, Copenhagen University Hospital Rigshospitalet, Copenhagen, Denmark.<sup>3</sup>Emergency Medical Services, the Capital Region of Denmark, Copenhagen, Denmark.<sup>4</sup>Department of Anaesthesiology and Intensive Care, Skåne University Hospital, Lund University, Lund, Sweden.

### Abstract

**STUDY OBJECTIVE:** Out-of-hospital cardiac arrest has an overall poor prognosis. We sought to identify what temporal trends and influencing factors existed for this condition in one region.

**METHODS:** We studied consecutive out-of-hospital cardiac arrest patients from 2007 to 2011 with attempted resuscitation in Copenhagen. From an Utstein database, we assessed survival to admission and comorbidity with the Charlson comorbidity index from the National Patient Registry and employment status from the Danish Rational Economic Agents Model database. We used logistic regression analyses to identify factors associated with outcome.

**RESULTS:** Of a total of 2,527 attempted resuscitations in out-of-hospital cardiac arrest patients, 40% (n=1,015) were successfully resuscitated and admitted to the hospital. The strongest independent factors associated with successful resuscitation were shockable primary rhythm (multivariate odds ratio [OR]=3.9; 95% confidence interval [CI] 3.1 to 5.0), witnessed arrest (multivariate OR=3.5; 95% CI 2.7 to 4.6), and out-of-hospital cardiac arrest in a public area (multivariate OR=2.1; 95% CI 1.6 to 2.8), whereas no comorbidity (multivariate OR=1.1; 95% CI 0.8 to 1.45), sex (multivariate OR=1.14; 95% CI 0.91 to 1.44), and employment status (multivariate OR=1.17; 95% CI 0.89 to 1.56) were not independently associated with outcome. The number of patients with a high comorbidity burden (Charlson comorbidity index  $\geq 3$ ) increased during the study period (P trend <.001), from 18% to 31% (P trend <.001), whereas the percentage of out-of-hospital cardiac arrest patients with successful resuscitation to hospital admission increased by 3% per year during the study period, from 37% in 2007 to 43% in 2011 (P trend <.001).

**CONCLUSION:** Our observations confirm the importance of key features that influence out-of-hospital cardiac arrest survival to hospital admission but are not highly influenced by public health actions. Despite increased illness burden, this short term outcome from cardiac arrest improved as care system efforts matured.

*Un altre sobre factors associats a supervivència*

**Resuscitation.** 2014 Dec 22. pii: S0300-9572(14)00891-0. doi: 10.1016/j.resuscitation.2014.12.009. [Epub ahead of print]

**The significance of pre-arrest factors in out-of-hospital cardiac arrests witnessed by emergency medical services: A report from the Victorian Ambulance Cardiac Arrest Registry.**

Nehme Z<sup>1</sup>, Andrew E<sup>2</sup>, Bray JE<sup>3</sup>, Cameron P<sup>3</sup>, Bernard S<sup>4</sup>, Meredith IT<sup>5</sup>, Smith K<sup>6</sup>.

Author information<sup>1</sup>Department of Research and Evaluation, Ambulance Victoria, Doncaster, VIC, Australia; Department of Epidemiology and Preventative Medicine, School of Public Health and Preventative Medicine, Monash University, Prahran, VIC, Australia. Electronic address: [ziad.nehme@ambulance.vic.gov.au](mailto:ziad.nehme@ambulance.vic.gov.au).<sup>2</sup>Department of Research and Evaluation, Ambulance Victoria, Doncaster, VIC, Australia; Department of Epidemiology and Preventative Medicine, School of Public Health and Preventative Medicine, Monash University, Prahran, VIC, Australia.<sup>3</sup>Department of Epidemiology and Preventative Medicine, School of Public Health and Preventative Medicine, Monash University, Prahran, VIC, Australia.<sup>4</sup>Department of Research and Evaluation, Ambulance Victoria, Doncaster, VIC, Australia; Department of Epidemiology and Preventative Medicine, School of Public Health and Preventative Medicine, Monash University, Prahran, VIC, Australia; Intensive Care Unit, Alfred Hospital, Prahran, VIC, Australia.<sup>5</sup>MonashHeart, Monash Medical Centre, Monash Health, Clayton, VIC, Australia.<sup>6</sup>Department of Research and Evaluation, Ambulance Victoria, Doncaster, VIC,

Australia; Department of Epidemiology and Preventative Medicine, School of Public Health and Preventative Medicine, Monash University, Prahran, VIC, Australia; Discipline of Emergency Medicine, School of Primary, Aboriginal and Rural Health Care, University of Western Australia, Crawley, WA, Australia.

#### **Abstract**

**BACKGROUND:** The significance of pre-arrest factors in out-of-hospital cardiac arrests (OHCA) witnessed by emergency medical services (EMS) is not well established. The purpose of this study was to assess the association between prodromal symptoms and pre-arrest clinical observations on the arresting rhythm and survival in EMS witnessed OHCA.

**METHODS:** Between 1st January 2003 and 31st December 2011, 1056 adult EMS witnessed arrests of a presumed cardiac aetiology were identified from the Victorian Ambulance Cardiac Arrest Registry. Pre-arrest prodromal features and clinical characteristics were extracted from the patient care record. Backward elimination logistic regression was used to identify pre-arrest factors associated with an initial shockable rhythm and survival to hospital discharge.

**RESULTS:** The median age was 73.0 years, 690 (65.3%) were male, and the rhythm of arrest was shockable in 465 (44.0%) cases. The most commonly reported prodromal symptoms prior to arrest were chest pain (48.8%), dyspnoea (41.8%) and altered consciousness (37.8%). An unrecordable systolic blood pressure was observed in 34.4%, a respiratory rate <13 or >24min<sup>-1</sup> was present in 43.1%, and 45.5% had a Glasgow coma score <15. In the multivariable analysis, the following pre-arrest factors were significantly associated with survival: age, public location, aged care facility, chest pain, arm or shoulder pain, dyspnoea, dizziness, vomiting, ventricular tachycardia, pulse rate, systolic blood pressure, respiratory rate, Glasgow coma score, aspirin and inotrope administration.

**CONCLUSION:** Pre-arrest factors are strongly associated with the arresting rhythm and survival following EMS witnessed OHCA. Potential opportunities to improve outcomes exist by way of early recognition and management of patients at risk of OHCA.

## **HIPOTÈRMIA**

*No sembla que hagi relació entre PAm durant la hipotèrmia i la supervivència*

**Resuscitation.** 2014 Dec 22. pii: S0300-9572(14)00890-9. doi: 10.1016/j.resuscitation.2014.12.008. [Epub ahead of print]

### **Higher achieved mean arterial pressure during therapeutic hypothermia is not associated with neurologically intact survival following cardiac arrest.**

Young MN1, Hollenbeck RD2, Pollock JS3, Giuseffi JL4, Wang L5, Harrell FE5, McPherson JA6.

Author information<sup>1</sup>Division of Cardiovascular Medicine (MNY, JAM), Vanderbilt University Medical Center, Nashville, TN, USA. Electronic address: [michael.young@vanderbilt.edu](mailto:michael.young@vanderbilt.edu).<sup>2</sup>Mercy Cardiology Clinic (RDH), Mercy Medical Center-Cedar Rapids, Cedar Rapids, IA, USA.<sup>3</sup>Division of Cardiovascular Medicine (JSP), University of Maryland Medical Center, Baltimore, USA.<sup>4</sup>Cardiovascular Division (JLG), WellStar Medical Group, Marietta, GA, USA.<sup>5</sup>Department of Biostatistics (LW, FEH), Vanderbilt University Medical Center, Nashville, TN, USA.<sup>6</sup>Division of Cardiovascular Medicine (MNY, JAM), Vanderbilt University Medical Center, Nashville, TN, USA.

#### **Abstract**

**INTRODUCTION:** To determine if higher achieved mean arterial blood pressure (MAP) during treatment with therapeutic hypothermia (TH) is associated with neurologically intact survival following cardiac arrest.

**METHODS:** Retrospective analysis of a prospectively collected cohort of 188 consecutive patients treated with TH in the cardiovascular intensive care unit of an academic tertiary care hospital.

RESULTS: Neurologically intact survival was observed in 73/188 (38.8%) patients at hospital discharge and in 48/162 (29.6%) patients at a median follow up interval of 3 months. Patients in shock at the time of admission had lower baseline MAP at the initiation of TH (81 versus 87mmHg;  $p=0.002$ ), but had similar achieved MAP during TH (80.3 versus 83.7mmHg;  $p=0.11$ ). Shock on admission was associated with poor survival (18% versus 52%;  $p<0.001$ ). Vasopressor use among all patients was common (84.6%) and was not associated with increased mortality. A multivariable analysis including age, initial rhythm, time to return of spontaneous circulation, baseline MAP and achieved MAP did not demonstrate a relationship between MAP achieved during TH and poor neurological outcome at hospital discharge (OR 1.28, 95% CI 0.40-4.06;  $p=0.87$ ) or at outpatient follow up (OR 1.09, 95% CI 0.32-3.75;  $p=0.976$ ).

CONCLUSION: We did not observe a relationship between higher achieved MAP during TH and neurologically intact survival. However, shock at the time of admission was clearly associated with poor outcomes in our study population. These data do not support the use of vasopressors to artificially increase MAP in the absence of shock. There is a need for prospective, randomized trials to further define the optimum blood pressure target during treatment with TH.

*Predicció del pronòstic dels pacients en coma recuperats d'una ACR mitjançant ressonància magnètica*

**Resuscitation.** 2014 Dec 22. pii: S0300-9572(14)00894-6. doi: 10.1016/j.resuscitation.2014.11.031. [Epub ahead of print]

**Efficacy of diffusion-weighted magnetic resonance imaging performed before therapeutic hypothermia in predicting clinical outcome in comatose cardiopulmonary arrest survivors.**

Park JS1, Lee SW1, Kim H1, Min JH2, Kang JH1, Yi KS3, Park KH4, Lee BK5.

Author information<sup>1</sup>Department of Emergency Medicine, College of Medicine, Chungbuk National University Hospital, Cheongju, Republic of Korea.<sup>2</sup>Department of Emergency Medicine, College of Medicine, Chungbuk National University Hospital, Cheongju, Republic of Korea. Electronic address: [shiphid@hanmail.net](mailto:shiphid@hanmail.net).<sup>3</sup>Department of Radiology, College of Medicine, Chungbuk National University Hospital, Cheongju, Republic of Korea.<sup>4</sup>Department of Emergency Medicine, Inje University, Busan, South Korea.<sup>5</sup>Department of Emergency Medicine, Chonnam National University Hospital, 42, Jebong-ro, Donggu, Gwangju, Republic of Korea.

#### **Abstract**

AIM OF THE STUDY: To develop a clinically relevant and qualitative brain magnetic resonance imaging (MRI) scoring system for acute stage comatose cardiac arrest patients.

METHODS: Consecutive comatose post-cardiopulmonary arrest patients were prospectively enrolled. Routine brain MRI sequences were scored by two independent and blinded experts. Predefined brain regions were qualitatively scored on diffusion-weighted imaging (DWI) sequences according to the severity of the abnormality on a scale from 0 to 4. The mean score provided by the raters determined poor outcome defined under the Cerebral Performance Categories 3, 4, or 5. DWI scans were repeated after therapeutic hypothermia (TH). The same qualitative scoring system was applied and results were compared to the initial scores.

RESULTS: Out of 24 recruited patients, 19 with brain MRI scans were included. Of the 19 included patients, seven showed a good outcome at hospital discharge and 12 patients showed poor neurologic outcome. Median time from the arrest to the initial DWI was 166min (IQR 114-240min). At 100% specificity, the overall, cortex, and cortex plus deep grey nuclei scores predicted poor patient outcome with a sensitivity of 91.7-100% (95% CI). Follow-up DWI scans after TH showed worse results than initial scans.

CONCLUSION: A qualitative MRI scoring system effectively assessed the severity of hypoxic-ischaemic brain injury following cardiopulmonary arrest. The scoring system may provide useful prognostic information in comatose cardiopulmonary arrest patients.

## DISPOSITIUS INTRAOSIS

*Oh! Gran notícia! Els alemanys, com el SEM, tenen EZ-IO als seus helicòpters! Així, perquè ells ho publiquen I nosaltres no???*

**Resuscitation.** 2014 Dec 29. pii: S0300-9572(14)00899-5. doi: 10.1016/j.resuscitation.2014.12.015. [Epub ahead of print]

### **EZ-IO® intraosseous device implementation in German Helicopter Emergency Medical Service.**

Helm M1, Haunstein B2, Schlechtriemen T3, Ruppert M4, Lampl L2, Gäßler M4.

Author information<sup>1</sup>Department of Anaesthesiology & Intensive Care Medicine-Section Emergency Medicine/HEMS "Christoph 22". Armed Forces Medical Centre Ulm, Germany. Electronic address: [matthias.helm@extern.uni-ulm.de](mailto:matthias.helm@extern.uni-ulm.de).<sup>2</sup>Department of Anaesthesiology & Intensive Care Medicine-Section Emergency Medicine/HEMS "Christoph 22". Armed Forces Medical Centre Ulm, Germany.<sup>3</sup>Medical Quality Management - ADAC Luftrettung (subsidiary of the german automobile association) Munich, Germany.<sup>4</sup>Department of Medicine-ADAC Luftrettung (subsidiary of the german automobile association) Munich, Germany.

#### Abstract

**BACKGROUND:** Intraosseous access (IO) is a rapid and safe alternative when peripheral venous access is difficult. Our aim was to summarize the first three years experience with the use of a semi-automatic IO device (EZ-IO®) in German Helicopter Emergency Medical Service (HEMS).

**METHODS:** Included were all patients during study period (January 2009-December 2011) requiring an IO access performed by HEMS team. Outcome variables were IO rate, IO insertion success rates, site of IO access, type of EZ-IO® needle set used, strategy of vascular access, procedure related problems and operator's satisfaction.

**RESULTS:** IO rate was 0.3% (348/120.923). Overall success rate was 99.6% with a first attempt success rate of 85.9%; there was only one failure (0.4%). There were three insertion sites: proximal tibia (87.2%), distal tibia (7.5%) and proximal humerus (5.3%). Within total study group IO was predominantly the second-line strategy (39% vs. 61%,  $p < 0.001$ ), but in children  $< 7$  years, in trauma cases and in cardiac arrest IO was more often first-line strategy (64% vs. 28%,  $p < 0.001$ ; 48% vs. 34%,  $p < 0.032$ ; 50% vs. 29%,  $p < 0.002$  respectively). Patients with IO access were significantly younger ( $41.7 \pm 28.7$  vs.  $56.5 \pm 24.4$  years;  $p < 0.001$ ), more often male (63.2% vs. 57.7%;  $p = 0.037$ ), included more trauma cases (37.3% vs. 30.0%;  $p = 0.003$ ) and more often patients with a NACA-Score  $\geq 5$  rating (77.0% vs. 18.6%;  $p < 0.001$ ). Patients who required IO access generally presented with more severely compromised vital signs associated with the need for more invasive resuscitation actions such as intubation, chest drains, CPR and defibrillation. In 93% EZ-IO® needle set handling was rated "good". Problems were reported in 1.6% (needle dislocation 0.8%, needle bending 0.4% and parafusion 0.4%).

**CONCLUSIONS:** The IO route was generally used in the most critically ill of patients. Our relatively low rate of usage would indicate that this would be compatible with the recommendations of established guidelines. The EZ-IO® intraosseous device proved feasible with a high success rate in adult and pediatric emergency patients in HEMS.

## IOT

*La video laringoscòpia millora l'èxit de la intubació al primer intent en metges novells.*

**Resuscitation.** 2014 Dec 22. pii: S0300-9572(14)00893-4. doi: 10.1016/j.resuscitation.2014.12.010. [Epub ahead of print]

### **Video laryngoscopy improves the first-attempt success in endotracheal intubation during cardiopulmonary resuscitation among novice physicians.**

Park SO1, Kim JW2, Na JH3, Lee KH3, Lee KR2, Hong DY2, Baek KJ2.

Author information<sup>1</sup>Department of Emergency Medicine, School of medicine, Konkuk University, Konkuk University Medical Center, Seoul, Republic of Korea. Electronic address: [empso@kuh.ac.kr](mailto:empso@kuh.ac.kr).<sup>2</sup>Department of Emergency Medicine, School of medicine, Konkuk University, Konkuk University Medical Center, Seoul, Republic of Korea.<sup>3</sup>Department of Emergency Medicine, International St. Mary's Hospital, Incheon, Republic of Korea.

### Abstract

**AIM:** To compare the first-attempt success in endotracheal intubation (ETI) during cardiopulmonary resuscitation (CPR) using direct laryngoscopy (DL) and video laryngoscopy (VL) (GlideScope®) among novice emergency physicians (EPs).

**METHODS:** This study is a historically controlled clinical design. From May 2011 to April 2013 out-of-hospital cardiac arrest patients were intubated during CPR by novice EPs. CPR data was automatically recorded by pre-installed video and subsequently analysed. The primary outcome was the success rate of the first-attempt at ETI. In addition, time to successful ETI from first-attempt (T-complete), duration of chest compression interruptions, and incidence of oesophageal intubation were compared.

**RESULTS:** Of 305 patients undergoing ETI, 83 were intubated by novice EPs. The success rate of first-attempt ETI in the VL group (n=49) was higher than that in the DL group (n=34, 91.8% vs. 55.9%; p<0.001). The median T-complete was significantly shorter with VL than with DL (37 [29-55] vs. 62 [56-110] s; p<0.001). Oesophageal intubation was observed only in the DL group (n=6, 17.6%). The median duration of chest compression interruptions was greater with DL (7 [3-6] s) than with VL (0 [0-0] s). Improvements in ETI during CPR were observed in the VL group after the first 3 months, but not the DL group during regular use for 1 year.

**CONCLUSIONS:** For novice EPs, the VL could significantly improve the first-attempt success in ETI during CPR while the DL couldn't improve it.

## CASE REPORTS

*Ressuscitat després de més de 3h de RCP... però amb una mica de trampa em sembla.*

*Tex Heart Inst J.* 2014 Apr 1;41(2):222-6. doi: 10.14503/THIJ-13-3192. eCollection 2014.

### **A case of survival after cardiac arrest and 3½ hours of resuscitation.**

Nusbaum DM1, Bassett ST1, Gregoric ID1, Kar B1.

Author information<sup>1</sup>Departments of Cardiology (Drs. Bassett, Kar, and Nusbaum) and Cardiovascular Surgery (Dr. Gregoric), Texas Heart Institute, Houston, Texas 77030.

### Abstract

Although survival rates after cardiac arrest remain low, new techniques are improving patients' outcomes. We present the case of a 40-year-old man who survived a cardiac arrest that lasted approximately 3½ hours. Resuscitation was performed with strict adherence to American Heart Association/American College of Cardiology Advanced Cardiac Life Support guidelines until bedside extracorporeal membrane oxygenation could be placed. A hypothermia protocol was initiated immediately afterwards. The patient had a full neurologic recovery and was bridged from dual ventricular assist devices to a total artificial heart. On hospital day 160, he underwent orthotopic heart and cadaveric kidney transplantation. On day 179, he was discharged from the hospital in ambulatory condition. To our knowledge, this is the only reported case in which a patient survived with good neurologic outcomes after a resuscitation that lasted as long as 3½ hours. Documented cases of resuscitation with good recovery after prolonged arrest give hope for improved overall outcomes in the future.

*Una causa extranya d'ACR o el que fan alguns (en aquest cas alguna) per continuar fent running...*



*Tex Heart Inst J.* 2014 Apr 1;41(2):212-6. doi: 10.14503/THIJ-12-2867. eCollection 2014.

**Sudden cardiac arrest at the finish line: in coronary ectopia, the cause of ischemia is from intramural course, not ostial location.**

Joggerst S1, Monge J1, Uribe C1, Sherron S1, Angelini P1.

Author information1Department of Cardiology, Texas Heart Institute, Houston, Texas 77030.

**Abstract**

A 26-year-old woman, a well-trained runner, had a sudden cardiac arrest just before crossing the finish line of a marathon. She was rapidly resuscitated and was later found to have an ectopic origin of the left coronary artery. This anomaly was surgically repaired by translocating the ostium from the right to the left sinus of Valsalva. Her difficult postoperative course prompted further coronary evaluation, which revealed severe stenosis of the neoostium. The patient underwent a second operation: this time, the stenosis was bypassed via a left internal mammary artery-to-left anterior descending coronary artery (LAD) graft. Hypoplasia of the LAD and spasm during manipulation caused the graft to fail, necessitating double-stent angioplasty of the left main ostium and the LAD 2 months later. At the patient's 6-month follow-up examination, she had no further evidence of functional ischemia, and she resumed jogging. Because the mode and mechanism of the patient's condition and events were documented in unusual detail, this case furthers our understanding of sudden cardiac arrest in athletes who have rare coronary anomalies. We conclude that ectopia of a coronary artery does not itself cause potentially fatal ischemia. Rather, these events are due to the ectopic artery's intramural proximal course within the aortic media, which might result in critical stenosis by means of hypoplasia or lateral compression of the artery.

## COMPRESSIONS TORÀCIQUES

*La freqüència de entre 100 i 120 és la que s'associa a una major supervivència. L'únic dubte que em deixa és si els equips que feien freqüències diferents a les recomanades no serien pitjors i per això la supervivència era menor. És per la única cosa que sembla que no han ajustat els resultats. Molt interessant però.*

*Crit Care Med.* 2015 Jan 6. [Epub ahead of print]

**Chest Compression Rates and Survival Following Out-of-Hospital Cardiac Arrest.**

Idris AH1, Guffey D, Pepe PP, Brown SP, Brooks SC, Callaway CW, Christenson J, Davis DP, Daya MR, Gray R, Kudenchuk PJ, Larsen J, Lin S, Menegazzi JJ, Sheehan K, Sopko G, Stiell I, Nichol G, Aufderheide TP; for The Resuscitation Outcomes Consortium Investigators.

Author information11Departments of Emergency Medicine and Internal Medicine, University of Texas Southwestern Medical Center, Dallas, TX. 2Clinical Trials Center, Department of Biostatistics, University of Washington, Seattle, WA. 3Department of Emergency Medicine, University of Texas Southwestern Medical Center, Dallas, TX. 4Department of Emergency Medicine, Queen's University, Toronto, Ontario, Canada. 5Department of Emergency Medicine, University of Pittsburgh, PA. 6Department of Emergency Medicine, University of British Columbia, Vancouver, British Columbia, Canada. 7Department of Emergency Medicine, University of California, San Diego Medical Center, San Diego, CA. 8Department of Emergency Medicine, Oregon Health & Science University, Portland, OR. 9Department of Emergency Medicine, University of Alabama, Birmingham, AL. 10Division of Cardiology, Department of Medicine, University of Washington, Seattle, WA. 11Seattle Fire Department, Seattle, WA. 12Division of Emergency Medicine, Department of Medicine, University of Toronto, Toronto, Ontario, Canada. 13National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD. 14Department of Emergency Medicine and Ottawa Hospital Research Institute, University of Ottawa, Ottawa, Ontario, Canada. 15Department of Medicine, University of

Washington, Seattle, WA. 16Department of Emergency Medicine, Medical College of Wisconsin, Milwaukee, WI.

### **Abstract**

**OBJECTIVE:** Guidelines for cardiopulmonary resuscitation recommend a chest compression rate of at least 100 compressions/min. A recent clinical study reported optimal return of spontaneous circulation with rates between 100 and 120/min during cardiopulmonary resuscitation for out-of-hospital cardiac arrest. However, the relationship between compression rate and survival is still undetermined.

**DESIGN:** Prospective, observational study.

**SETTING:** Data is from the Resuscitation Outcomes Consortium Prehospital Resuscitation Impedance threshold device and Early versus Delayed analysis clinical trial.

**PARTICIPANTS:** Adults with out-of-hospital cardiac arrest treated by emergency medical service providers.

**INTERVENTIONS:** None.

**MEASUREMENTS MAIN RESULTS:** Data were abstracted from monitor-defibrillator recordings for the first five minutes of emergency medical service cardiopulmonary resuscitation. Multiple logistic regression assessed odds ratio for survival by compression rate categories (<80, 80-99, 100-119, 120-139,  $\geq 140$ ), both unadjusted and adjusted for sex, age, witnessed status, attempted bystander cardiopulmonary resuscitation, location of arrest, chest compression fraction and depth, first rhythm, and study site. Compression rate data were available for 10,371 patients; 6,399 also had chest compression fraction and depth data. Age (mean  $\pm$  SD) was  $67 \pm 16$  years. Chest compression rate was  $111 \pm 19$  per minute, compression fraction was  $0.70 \pm 0.17$ , and compression depth was  $42 \pm 12$  mm. Circulation was restored in 34%; 9% survived to hospital discharge. After adjustment for covariates without chest compression depth and fraction ( $n = 10,371$ ), a global test found no significant relationship between compression rate and survival ( $p = 0.19$ ). However, after adjustment for covariates including chest compression depth and fraction ( $n = 6,399$ ), the global test found a significant relationship between compression rate and survival ( $p = 0.02$ ), with the reference group (100-119 compressions/min) having the greatest likelihood for survival.

**CONCLUSIONS:** After adjustment for chest compression fraction and depth, compression rates between 100 and 120 per minute were associated with greatest survival to hospital discharge.

### **REGISTRES**

*La presència de metges especialistes a les ambulàncies, millora la supervivència de les ACR extrahospitalaries, comparat amb els sistemes basats en paramèdics*

**BMJ Open.** 2015 Jan 7;5(1):e006167. doi: 10.1136/bmjopen-2014-006167.

#### **Outcome following physician supervised prehospital resuscitation: a retrospective study.**

Mikkelsen S1, Krüger AJ2, Zwisler ST3, Brøchner AC4.

Author information1Mobile Emergency Care Unit, Department of Anaesthesiology and Intensive Care Medicine, Odense University Hospital, Odense, Denmark Faculty of Medical Sciences, Institute of Clinical Research, University of Southern Denmark, Odense, Denmark.2Department of Anaesthesia and Emergency Medicine, St. Olavs Hospital, Trondheim, Norway.3Department of Anaesthesiology and Intensive Care Medicine, Odense University Hospital, Odense, Denmark.4Faculty of Medical Sciences, Institute of Clinical Research, University of Southern Denmark, Odense, Denmark Department of Anaesthesiology and Intensive Care Medicine, Odense University Hospital, Odense, Denmark.

### **Abstract**

**BACKGROUND:** Prehospital care provided by specially trained, physician-based emergency services (P-EMS) is an integrated part of the emergency medical systems in many developed countries. To what extent P-EMS increases survival and favourable outcomes is still unclear.

The aim of the study was thus to investigate ambulance runs initially assigned 'life-saving missions' with emphasis on long-term outcome in patients treated by the Mobile Emergency Care Unit (MECU) in Odense, Denmark

**METHODS:** All MECU runs are registered in a database by the attending physician, stating, among other parameters, the treatment given, outcome of the treatment and the patient's diagnosis. Over a period of 80 months from May 1 2006 to December 31 2012, all missions in which the outcome of the treatment was registered as 'life saving' were scrutinised. Initial outcome, level of competence of the caretaker and diagnosis of each patient were manually established in each case in a combined audit of the prehospital database, the discharge summary of the MECU and the medical records from the hospital. Outcome parameters were final outcome, the aetiology of the life-threatening condition and the level of competences necessary to treat the patient.

**RESULTS:** Of 25 647 patients treated by the MECU, 701 (2.7%) received prehospital 'life saving treatment'. In 596 (2.3%) patients this treatment exceeded the competences of the attending emergency medical technician or paramedic. Of these patients, 225 (0.9%) were ultimately discharged to their own home.

**CONCLUSIONS:** The present study demonstrates that anaesthesiologist administrated prehospital therapy increases the level of treatment modalities leading to an increased survival in relation to a prehospital system consisting of emergency medical technicians and paramedics alone and thus supports the concept of applying specialists in anaesthesiology in the prehospital setting especially when treating patients with cardiac arrest, patients in need of respiratory support and trauma patients.

## **FIBRIL·LACIÓ VENTRICULAR**

*Suposar que el llindar de DF dels animals és igual al dels humans, sembla ser una suposició incorrecta.*

**Conf Proc IEEE Eng Med Biol Soc.** 2014 Aug;2014:6483-6. doi: 10.1109/EMBC.2014.6945113.

### **Limitations of animal electrical cardiac safety models.**

Panescu D, Kroll M, Brave M.

#### **Abstract**

**Introduction** - Human electrical safety standards are based almost exclusively on animal studies and there is an unjustified assumption that ventricular fibrillation (VF) thresholds in animals are the same as those in humans.

**Methods and Results** - We analyzed differences between animals and humans in cardiac stimulation. A broad literature survey revealed that swine are a fragile electrophysiologic research species and have a dense intramural Purkinje fiber network, which is not found in some other species, including humans. Anesthesia agents have to be chosen carefully as swine are prone to malignant hyperthermia. Cardiac stimulation thresholds depend on weight and capture rates. Thus, the animal weight has to be representative of the weight of human subjects. Studies have shown significant ECG differences between humans and other species, including swine and canine. At least one study suggested that rabbit hearts tend to develop VF in a manner more similar to that seen in humans.

**Conclusion** - Animal studies can play a role in conservatively evaluating cardiac safety. However, while still abiding by the precautionary principle, animal study design has to take into account the significant anatomical and electrophysiological differences between humans and other mammals. Data from multiple animal models may offer broader perspectives. If attempts are made to extrapolate animal results to humans then appropriate numerical correction factors should be applied, such as some of those discussed in this article.

*Si us disparen amb una Taser, que us encertin a l'esternum i si us han de posar uns pegats per DF en posició AP, que no us l'encertin!*

**Conf Proc IEEE Eng Med Biol Soc.** 2014 Aug;2014:4464-70. doi: 10.1109/EMBC.2014.6944615.

**The sternum as an electrical shield.**

Panescu D, Kroll M, Iverson C, Brave M.

**Abstract**

Introduction - The TASER(®) conducted electrical weapon (CEW) delivers electrical pulses that can temporarily incapacitate subjects. We analyzed the distribution of TASER CEW currents in tissues posterior to the sternum to understand the likelihood of triggering cardiac arrhythmias. We also assessed the electrical 'shielding' effects of the sternum. Methods and Results - Finite element modeling (FEM) was used to approximate the current density and electric field strength in tissues around the sternum. We analyzed 2 CEW dart deployment scenarios: (a) both darts over the anterior aspect of the sternum; and (b) a CEW dart anterior to the sternum and the other over the abdomen. In both scenarios, the sternum provided significant attenuation of CEW currents. Particularly, both FEMs predicted that the residual electrical current or charge from CEWs would be insufficient to cause either cardiac capture or induction of ventricular fibrillation at locations where cardiac tissue would reside relative to the posterior aspect of the sternum. Conclusion - The sternum offers significant 'shielding' effect and protects the tissues posterior to it against effects of electrical current flow from anteriorly-placed CEW electrodes.

## **HIPOTÈRMIA**

*Sembla que aquí ho fem millor a l'hora de posar-nos d'acord per fer les coses com toca. Potser serà un dels grans aventatges d'un Sistema Públic de Salut envers la sanitat privada?. Això no vol dir que no haguem de millorar i consensuar un Codi Aturada entre SEM i hospitals a Catalunya.*

**Ther Hypothermia Temp Manag.** 2015 Jan 7. [Epub ahead of print]

**National Trends in the Use of Postcardiac Arrest Therapeutic Hypothermia and Hospital Factors Influencing Its Use.**

Dresden SM1, O'Connor LM, Pearce CG, Courtney DM, Powell ES.

Author information<sup>11</sup> Department of Emergency Medicine, Feinberg School of Medicine, Northwestern University, Chicago, Illinois.

**Abstract**

Background: Therapeutic hypothermia (TH) in cardiac arrest continues to be underused in the United States. A better understanding of its utilization could inform future efforts and policies to improve utilization. This study investigates trends in TH use for in and out-of-hospital cardiac arrest, and hospital factors associated with its use. Methods: We performed a cross-sectional analysis using the Nationwide Inpatient Sample (NIS), 2007-2010, of US adult hospitalizations with cardiac arrest. Annual rates of TH use and proportions of hospitals using TH were calculated using NIS weighting. Potential hospital factors associated with increased likelihood of TH utilization were assessed using logistic regression. Results: Across 2007-2010, 1.35% of cardiac arrest patients received TH; increasing from 0.34% (2007) to 2.49% (2010). The proportion of hospitals using TH was 13.63%, increasing from 4.63% (2007) to 22.16% (2010). Significant hospital factors associated with TH utilization were: large hospitals, urban location, Northeast or West regions, teaching hospitals, non-safety net hospitals, increasing year, and hospitals with higher annual cardiac arrest volume. Conclusion: Utilization of TH in cardiac arrest remains low, but increased sevenfold from 2007 to 2010. The significant

variability in implementation of TH, argues for nationwide best practices or regionalization of postcardiac arrest care hospitals.

*Abstract interesant sobre quan fer hipotèrmia per racionalitzar els recursos.*

**Crit Pathw Cardiol.** 2014 Jun;13(2):78-81. doi: 10.1097/HPC.000000000000011.

**Putting class IIb recommendations to the test: the influence of unwitnessed and Non-VT/VF arrests on resource consumption and outcomes in therapeutic hypothermia and targeted temperature management.**

Buntaine AJ<sup>1</sup>, Dangerfield C, Pulikottil T, Katz LM, Cook AM, Reed BN, Katz JN.

Author information<sup>1</sup>From the \*Department of Internal Medicine, University of North Carolina, Chapel Hill, NC; †Division of Cardiology and Pulmonary & Critical Care, University of North Carolina Center for Heart and Vascular Care, Chapel Hill, NC; ‡Kaiser Permanente, Atlanta, GA; §Department of Emergency Medicine, University of North Carolina, Chapel Hill, NC; ¶Department of Pharmacy, Loyola University Medical Center, Maywood, IL; and Department of Pharmacy Practice and Science, University of Maryland, School of Pharmacy, Baltimore, MD.

#### **Abstract**

Therapeutic hypothermia (TH) and targeted temperature management improve neurologic recovery, and survival for patients resuscitated from witnessed out-of-hospital ventricular tachycardia (VT) and ventricular fibrillation (VF) cardiac arrest. The American Heart Association recently gave a class IIb recommendation for the use of TH for non-VT/VF and unwitnessed arrests. We explored changes in baseline characteristics, resource use, and outcomes after expanding indications for TH at our institution based on these guidelines. Fifty-six consecutive patients treated with TH for out-of-hospital cardiac arrest were retrospectively evaluated based on whether they received treatment before (protocol 1) or after (protocol 2) broadening inclusion criteria. In protocol 1, TH was indicated after a witnessed VT/VF arrest. In protocol 2, TH was indicated for unwitnessed arrests, pulseless electrical activity, or asystole. Both populations undergoing TH had similarly extensive medical comorbidities and consumed considerable hospital resources. Overall, 64% of the patients from both protocols died in the hospital, although nominally lower mortality was seen in patients treated under protocol 1 compared with protocol 2 (59% vs. 67%,  $P = 0.57$ ). Lower mortality was observed after VT/VF than after pulseless electrical activity or asystole (47% vs. 93% vs. 56%,  $P = 0.017$ ). No patient survived following an unwitnessed arrest, and age (odds ratio per 10 years = 2.59; 95% confidence interval, 1.34-4.81) was independently associated with increased mortality. In an evolving field where best practice is still poorly defined, these data, along with future prospective studies in larger populations, should help to enhance care delivery and optimize cost-effectiveness strategies.

#### **MONITORATGE**

*La saturació abdominal i cerebral d'oxigen com a marcador de ROSC en l'ACR.*

**Am J Emerg Med.** 2014 Nov 28. pii: S0735-6757(14)00864-X. doi: 10.1016/j.ajem.2014.11.029. [Epub ahead of print]

**Abdominal oxygen saturation for monitoring return of spontaneous circulation in out-of-hospital cardiac arrest using near infrared spectrophotometry.**

Kalkan A<sup>1</sup>, Bilir O<sup>2</sup>, Ersunan G<sup>2</sup>, Ozel D<sup>3</sup>, Tas M<sup>4</sup>, Memetoglu ME<sup>5</sup>.

Author information<sup>1</sup>Department of Emergency Medicine, Faculty of Medicine, Recep Tayyip Erdogan University, Rize, Turkey. Electronic address: [drasimkalkan@hotmail.com](mailto:drasimkalkan@hotmail.com).<sup>2</sup>Department of Emergency Medicine, Faculty of Medicine, Recep Tayyip Erdogan University, Rize, Turkey.<sup>3</sup>Department of Biostatistics, Faculty of Medicine, Antalya University, Antalya, Turkey.<sup>4</sup>Department of Emergency Medicine, Diyarbakir Education and Research Hospital,

Diyarbakir, Turkey.<sup>5</sup>Department of Cardiovascular Surgery, Siyami Ersek Education and Research Hospital, Istanbul, Turkey.

#### **Abstract**

**AIM:** We used near-infrared spectrophotometry to assess the initial and final abdominal and cerebral saturations during cardiopulmonary resuscitation (CPR) of patients with out-of-hospital cardiac arrest to determine if there is a correlation between increase in these saturation values and return of spontaneous circulation.

**MATERIALS AND METHODS:** We evaluated 34 patients with out-of-hospital cardiac arrest without witnesses brought to our emergency department. Abdominal and cerebral saturations were measured using near-infrared spectrophotometry from the start of CPR. Cardiopulmonary resuscitation was performed for a maximum of 30 minutes. The effect of abdominal saturations in patients with or without spontaneous circulation restored through CPR was then assessed.

**RESULTS:** Thirty-four patients (17 males + females) with a mean age of  $63.06 \pm 11.66$  years were included in the study. A significant correlation was determined between increase in abdominal saturations measured at the start and end of CPR and the return of spontaneous circulation ( $P < .001$ ). A good positive correlation was also identified between abdominal saturation and return of spontaneous circulation.

**CONCLUSION:** Patients with increased abdominal and cerebral saturation values have a higher survival rate after appropriate CPR. This noninvasive measurement system and monitoring of patients during CPR may be a good method of predicting return of spontaneous circulation and assessing abdominal perfusion.

#### **CASE REPORT**

*Un cas de cremades cutànies per pegats refrigerants!*

*J Burn Care Res.* 2014 May-Jun;35(3):e184-6. doi: 10.1097/BCR.0b013e3182a22730.

#### **Skin necrosis as a complication of therapeutic hypothermia.**

Liu YM<sup>1</sup>, Ibrahim A, Jan T, Chang P, Fagan S, Goverman J.

Author information<sup>1</sup>From the \*Department of Surgery, Waterbury Hospital, Connecticut; and †Department of Surgery, Division of Burns, Massachusetts General Hospital, Boston.

#### **Abstract**

This case report describes a complication caused by cooling pads used for therapeutic hypothermic resuscitation. The authors hope to highlight and emphasize the importance of a thorough evaluation of all skin surfaces that are in direct contact with such cooling pads. Skin injury from the cooling pads used for therapeutic hypothermia should be recognized as a potential complication of treatment.

#### **REGISTRES I REVISIONS**

*No està clar que l'ECMO millori el que ja fem. Es necesiten més estudis de qualitat.*

*Cochrane Database Syst Rev.* 2015 Jan 22;1:CD010381. [Epub ahead of print]

#### **Extracorporeal membrane oxygenation for critically ill adults.**

Tramm R<sup>1</sup>, Ilic D, Davies AR, Pellegrino VA, Romero L, Hodgson C.

#### **Abstract**

**BACKGROUND:** Extracorporeal membrane oxygenation (ECMO) is a form of life support that targets the heart and lungs. Extracorporeal membrane oxygenation for severe respiratory failure accesses and returns blood from the venous system and provides non-pulmonary gas exchange. Extracorporeal membrane oxygenation for severe cardiac failure or for refractory

cardiac arrest (extracorporeal cardiopulmonary resuscitation (ECPR)) provides gas exchange and systemic circulation. The configuration of ECMO is variable, and several pump-driven and pump-free systems are in use. Use of ECMO is associated with several risks. Patient-related adverse events include haemorrhage or extremity ischaemia; circuit-related adverse effects may include pump failure, oxygenator failure and thrombus formation. Use of ECMO in newborns and infants is well established, yet its clinical effectiveness in adults remains uncertain.

**OBJECTIVES:** The primary objective of this systematic review was to determine whether use of veno-venous (VV) or venous-arterial (VA) ECMO in adults is more effective in improving survival compared with conventional respiratory and cardiac support.

**SEARCH METHODS:** We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (Ovid) and EMBASE (Ovid) on 18 August 2014. We searched conference proceedings, meeting abstracts, reference lists of retrieved articles and databases of ongoing trials and contacted experts in the field. We imposed no restrictions on language or location of publications.

**SELECTION CRITERIA:** We included randomized controlled trials (RCTs), quasi-RCTs and cluster-RCTs that compared adult ECMO versus conventional support.

**DATA COLLECTION AND ANALYSIS:** Two review authors independently screened the titles and abstracts of all retrieved citations against the inclusion criteria. We independently reviewed full-text copies of studies that met the inclusion criteria. We entered all data extracted from the included studies into Review Manager. Two review authors independently performed risk of bias assessment. All included studies were appraised with respect to random sequence generation, concealment of allocation, blinding of outcome assessment, incomplete outcome data, selective reporting and other bias.

**MAIN RESULTS:** We included four RCTs that randomly assigned 389 participants with acute respiratory failure. Risk of bias was low in three RCTs and high in one RCT. We found no statistically significant differences in all-cause mortality at six months (two RCTs) or before six months (during 30 days of randomization in one trial and during hospital stay in another RCT). The quality of the evidence was low to moderate, and further research is very likely to impact our confidence in the estimate of effects because significant changes have been noted in ECMO applications and treatment modalities over study periods to the present. Two RCTs supplied data on disability. In one RCT survival was low in both groups but none of the survivors had limitations in their daily activities six months after discharge. The other RCT reported improved survival without severe disability in the intervention group (transfer to an ECMO centre  $\pm$  ECMO) six months after study randomization but no statistically significant differences in health-related quality of life. In three RCTs, participants in the ECMO group received greater numbers of blood transfusions. One RCT recorded significantly more non-brain haemorrhage in the ECMO group. Another RCT reported two serious adverse events in the ECMO group, and another reported three adverse events in the ECMO group. Clinical heterogeneity between studies prevented meta-analyses across outcomes. We found no completed RCT that had investigated ECMO in the context of cardiac failure or arrest. We found one ongoing RCT that examined patients with acute respiratory failure and two ongoing RCTs that included patients with acute cardiac failure (arrest).

**AUTHORS' CONCLUSIONS:** Extracorporeal membrane oxygenation remains a rescue therapy. Since the year 2000, patient treatment and practice with ECMO have considerably changed as the result of research findings and technological advancements over time. Over the past four decades, only four RCTs have been published that compared the intervention versus conventional treatment at the time of the study. Clinical heterogeneity across these published studies prevented pooling of data for a meta-analysis. We recommend combining results of ongoing RCTs with results of trials conducted after the year 2000 if no significant shifts in technology or treatment occur. Until these new results become available, data on use of ECMO in patients with acute respiratory failure remain inconclusive. For patients with acute cardiac

failure or arrest, outcomes of ongoing RCTs will assist clinicians in determining what role ECMO and ECPR can play in patient care.

*A Austràlia tenen un registre d'ACRs des del 2002... i aquí l'OSHCAR que no acaba d'arrencar!!!*

**Circ Cardiovasc Qual Outcomes.** 2015 Jan;8(1):56-66. doi: 10.1161/CIRCOUTCOMES.114.001185.

**Using a cardiac arrest registry to measure the quality of emergency medical service care: decade of findings from the victorian ambulance cardiac arrest registry.**

Nehme Z1, Bernard S2, Cameron P2, Bray JE2, Meredith IT2, Lijovic M2, Smith K2.

#### **Abstract**

##### **BACKGROUND:**

Although the value of clinical registries has been well recognized in developed countries, their use for measuring the quality of emergency medical service care remains relatively unknown. We report the methodology and findings of a statewide emergency medical service surveillance initiative, which is used to measure the quality of systems of care for patients with out-of-hospital cardiac arrest.

##### **METHODS AND RESULTS:**

Between July 1, 2002, and June 30, 2012, data for adult out-of-hospital cardiac arrest cases of presumed cardiac cause occurring in the Australian Southeastern state of Victoria were extracted from the Victorian Ambulance Cardiac Arrest Registry. Regional and temporal trends in bystander cardiopulmonary resuscitation, event survival, and survival to hospital discharge were analyzed using logistic regression and multilevel modeling. A total of 32 097 out-of-hospital cardiac arrest cases were identified, of whom 14 083 (43.9%) received treatment by the emergency medical service. The risk-adjusted odds of receiving bystander cardiopulmonary resuscitation (odds ratio [OR], 2.96; 95% confidence interval, 2.62-3.33), event survival (OR, 1.55; 95% confidence interval, 1.30-1.85), and survival to hospital discharge (OR, 2.81; 95% confidence interval, 2.07-3.82) were significantly improved by 2011 to 2012 compared with baseline. Significant variation in rates of bystander cardiopulmonary resuscitation and survival were observed across regions, with arrests in rural regions less likely to survive to hospital discharge. The median OR for interhospital variability in survival to hospital discharge outcome was 70% (median OR, 1.70).

##### **CONCLUSIONS:**

Between 2002 and 2012, there have been significant improvements in bystander cardiopulmonary resuscitation and survival outcome for out-of-hospital cardiac arrest patients in Victoria, Australia. However, regional survival disparities and interhospital variability in outcomes pose significant challenges for future improvements in care.

*La qualitat de vida i el nivell cognitiu és més baix en els supervivents d'una ACR. Ara bé, la n de l'estudi és molt petita i pitjor seria si no haguessin sobreviscut.*

**Resuscitation.** 2015 Jan 19. pii: S0300-9572(15)00026-X. doi: 10.1016/j.resuscitation.2015.01.009. [Epub ahead of print]

**Life after cardiac arrest; a very long term follow up.**

Andersson AE1, Rosén H1, Sunnerhagen KS2.

#### **Abstract**

##### **AIM:**

To describe survival and causes of death after cardiac arrest (CA) and the life situation of very long term survivors.

##### **METHODS:**



Individuals with successful resuscitation treated at the Sahlgrenska university hospital during 1995-1999 and presented in former CA publications were studied. Survival time and causes of death data were extracted from the individuals who had died's records. Very long term survivors were offered a follow up visit at home. Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA) was used to describe cognitive abilities and EQ-5D to assess quality of life. The life situation was also explored.

#### RESULTS:

14 out of 104 possible participants had survived to follow up. The median time to follow up among the 8 who agreed to participation was 17 years. Out of the 8 participants, 4 failed to reach the cut off score of normal cognitive abilities in the MMSE and 7/8 participants did not reach the cut off score for normal cognitive function in the MoCA. Overall the participants were content with their life situation and QoL. However, a tendency towards lower scores on the cognitive testing and a lower self-reported QoL was observed. No depression, post-traumatic stress disorder or anxiety disorder were found.

#### CONCLUSIONS:

A CA may lead to permanent cognitive impairments and the risk of dementia may be higher because of the injuries sustained during the collapse. However, further studies with more participants are needed to fully determine the risk of cognitive impairment after a CA. Regarding life situation, there was a tendency of lower QoL with lower scores on the cognitive testing. With a new treatment paradigm, there is a need for long term studies regarding this new population

## HIPOTÈRMIA

*La hipotèrmia no afecta el pronòstic en funció de l'edat.*

**Resuscitation.** 2015 Jan 15. pii: S0300-9572(15)00014-3. doi: 10.1016/j.resuscitation.2014.12.030. [Epub ahead of print]

### **Mortality and neurological outcome in the elderly after target temperature management for out-of-hospital cardiac arrest.**

Winther-Jensen M1, Pellis T2, Kuiper M3, Koopmans M3, Hassager C4, Nielsen N5, Wetterslev J6, Cronberg T7, Erlinge D8, Friberg H9, Gasche Y10, Horn J11, Hovdenes J12, Stammet P13, Wanscher M4, Wise MP14, Åneman A15, Kjaergaard J4.

#### **Abstract**

AIM:

To assess older age as a prognostic factor in patients resuscitated from out-of-hospital-cardiac arrest (OHCA) and the interaction between age and level of target temperature management.

METHODS AND RESULTS:

950 patients included in the target temperature management (TTM) trial were randomly allocated to TTM at 33 or 36°C for 24h. We assessed survival and cerebral outcome (cerebral performance category, CPC and modified Rankin scale, mRS) using age as predictor, dividing patients into 5 age groups: ≤65 (median), 66-70, 71-75, 76-80 and >80 years of age. Shockable rhythm decreased with higher age groups,  $p=0.001$ , the same was true for ST segment elevation on ECG at admission,  $p<0.01$ . Increasing age was associated with a higher mortality rate (HR=1.04 per year, 95% CI=1.03-1.06,  $p<0.001$ ) after adjusting for confounders. Octogenarians had an increased mortality (HR=3.5, CI: 2.5-5.0,  $p<0.001$ ) compared to patients ≤65 years of age. Favorable vs. unfavorable outcome measured by CPC and mRS in survivors was different between age groups with adverse outcomes more prevalent in higher age groups (CPC:  $p=0.04$ , mRS:  $p=0.001$ ). The interaction between age and target temperature allocation was not statistically significant for either mortality or neurological outcome.

CONCLUSION:

Increasing age is associated with significantly increased mortality after OHCA, but mortality rate is not influenced by level of target temperature. Risk of poor neurological outcome also increases with age, but is not modified by level of target temperature

## PEDIATRIA

*Els ABBA van neixer per inspirar cançons per la RCP...*

*J Paediatr Child Health*. 2014 Jun;50(6):444-8. doi: 10.1111/jpc.12507. Epub 2014 Feb 26.

**How ABBA may help improve neonatal resuscitation training: auditory prompts to enable coordination of manual inflations and chest compressions.**

Roehr CC1, Schmölzer GM, Thio M, Dawson JA, Dold SK, Schmalisch G, Davis PG.

### Abstract

AIM:

Resuscitation guidelines recommend 90 chest compressions (CCs) and 30 inflations (INFs) per minute for neonatal cardiopulmonary resuscitation (nCPR). We hypothesised that auditory prompts would help coordinate these actions. Our aim was to investigate the effect of musical prompts during nCPR training on adherence to recommended CC and INF rates and on the quality of delivered INFs.

METHODS:

A simulation study was conducted employing 30 experienced neonatal staff, a respiratory function monitor and a neonatal manikin. The effects of five different auditory prompts on adherence to recommended rates of CC and INF were tested against baseline (no music). The five auditory prompts (popular musical tunes) were investigated in random order. Quality of INFs was assessed by comparing the peak inflation pressures (PIP), positive end-expiratory pressures (PEEP), percentage mask leak and tidal volumes (VT).

RESULTS:

Mean baseline rates at which CCs and INFs were delivered were 80 (SD 6) per minute and 28 (SD 2) per minute, respectively. Listening to auditory prompts had varying effects on CC and INF delivery rates. For CCs, a significant difference to baseline was found only when participants listened to ABBA's 'SOS', with 86 (SD 7) per minute ( $P = 0.04$ ). For INFs, we found a statistically significant improvement to baseline rate only for 'SOS', with 29 (SD 2) per minute ( $P = 0.04$ ), and there was no significant difference in INF quality among the auditory prompts.

CONCLUSIONS:

Musical prompts can help with adherence to recommended CC and INF rates but do not improve the quality of INFs during nCPR training. The lasting effect of auditory prompts as musical mnemonics on nCPR performance in vivo needs to be established.

*Un informe sobre l'ús del bicarbonat en les ACR pediàtriques. S'associa a mal pronòstic perquè l'utilitzem a la desesperada com a últim recurs???*

*Resuscitation*. 2015 Jan 19. pii: S0300-9572(15)00024-6. doi: 10.1016/j.resuscitation.2015.01.007. [Epub ahead of print]

**Sodium Bicarbonate Use During In-hospital Pediatric Pulseless Cardiac Arrest - A Report From the American Heart Association Get With The Guidelines®-Resuscitation.**

Raymond TT1, Stromberg D1, Stigall W1, Burton G1, Zaritsky A2; for the American Heart Association Get With the Guidelines-Resuscitation Investigators.

### Abstract

BACKGROUND:

Despite limited recommendations for using sodium bicarbonate (SB) during cardiopulmonary resuscitation (CPR), we hypothesized that SB continues to be used frequently during pediatric

in-hospital cardiac arrest (IHCA) and that its use varies by hospital-specific, patient-specific, and event-specific characteristics.

#### METHODS:

We analyzed 3,719 pediatric (<18 years) index pulseless CPR events from the American Heart Association Get With The Guidelines-Resuscitation database from 1/2000-9/2010.

#### RESULTS:

SB was used in 2,536 (68%) of 3,719 CPR events. Incidence of SB use between 2000-2005 vs. 2006-2010 was 71.1% vs. 66.2% ( $p=0.002$ ). The primary outcome was survival to discharge. Secondary outcomes included 24-hr survival and neurologic outcome. Multivariable logistic regression analyzed the association between SB use and outcomes. SB had increased use in an ICU location, metabolic/electrolyte disturbance, prolonged CPR, pVT/VF, and concurrently with other pharmacologic interventions. Adjusting for confounding factors, SB use was associated with decreased 24-hr survival (aOR 0.83, 95% CI 0.69, 0.99) and decreased survival to discharge (aOR 0.80; 95% CI: 0.65, 0.97). Inclusion of metabolic/electrolyte abnormalities, hyperkalemia, and toxicologic abnormalities only ( $n=674$ ), SB use was not associated with worse outcomes or unfavorable neurologic outcome.

#### CONCLUSIONS:

SB is used frequently during pediatric pulseless IHCA, yet there is a significant trend towards less routine use over the last decade. Because SB is more likely to be used in an ICU, with prolonged CPR, and concurrently with other pharmacologic interventions; its use during CPR may be associated with poor prognosis due to an association with "last ditch" efforts of resuscitation rather than causation.

## FV i DF

*Les raons de perquè hem de fer RCP durant dos minuts immediatament després de desfibril·lar.*

**Resuscitation.** 2015 Jan 15. pii: S0300-9572(15)00005-2. doi: 10.1016/j.resuscitation.2014.12.023. [Epub ahead of print]

**The need to resume chest compressions immediately after defibrillation attempts: An analysis of post-shock rhythms and duration of pulselessness following out-of-hospital cardiac arrest.**

Pierce AE1, Roppolo LP2, Owens P2, Pepe PE2, Idris AH2.

#### Abstract

##### AIM:

Current consensus guidelines for cardiopulmonary resuscitation (CPR) recommend that chest compressions resume immediately after defibrillation attempts and that rhythm and pulse checks be deferred until completion of 5 compression:ventilation cycles or minimally for 2min. However, data specifically confirming the post-shock duration of asystole or pulseless electrical activity before return of spontaneous circulation (ROSC) are lacking. Our aim was to describe the frequency of the various post-shock cardiac rhythms and the duration of post-shock pulselessness in out-of-hospital non-traumatic cardiac arrest.

##### METHOD:

Using prospectively-collected data from the Resuscitation Outcomes Consortium (ROC) Epistry database, the investigators reviewed monitor-defibrillator recordings of 176 patients who received defibrillation attempts in the out-of-hospital setting for ventricular fibrillation (VF) or ventricular tachycardia (VT) with absent pulses,.

##### RESULTS:

Among 376 different defibrillation attempts delivered in the 176 patients, there were 182 resulting episodes of post-shock asystole. The mean interval of asystole after defibrillation was  $69\pm 136s$  (median 20s; IQR 36) and the mean interval for return of an organized rhythm was  $64\pm 157s$  (median 7s; IQR 26). The mean time to ROSC was  $280\pm 320s$  (median 136s; IQR 445).

**CONCLUSION:**

After defibrillation attempts, the majority of patients remain pulseless for over 2min and the duration of asystole before return of pulses is longer than 120s beyond the shock gap in as many as 25%. These data support the recommendation to immediately resume chest compressions for 2min following attempted defibrillation.