REGISTRES I REVISIONS

1. **Scand J Trauma Resusc Emerg Med**. 2018 Mar 27;26(1):21. doi: 10.1186/s13049-018-0489-y.
Pre-hospital extra-corporeal cardiopulmonary resuscitation.
Singer B1,2,3, Reynolds JC4, Lockey DJ5, O'Brien B6,7,8.
Abstract
Survival from out-of-hospital cardiac arrest (OHCA) has remained low despite advances in resuscitation science. Hospital-based extra-corporeal cardiopulmonary resuscitation (ECPR) is a novel use of an established technology that provides greater blood flow and oxygen delivery during cardiac arrest than closed chest compressions. Hospital-based ECPR is currently offered to selected OHCA patients in specialized centres. The interval between collapse and restoration of circulation is inversely associated with good clinical outcomes after ECPR. Pre-hospital delivery of ECPR concurrent with conventional resuscitation is one approach to shortening this interval and improving outcomes after OHCA. This article examines the background and rationale for pre-hospital ECPR; summarises the findings of a literature search for published evidence; and considers candidate selection, logistics, and complications for this complex intervention.
Free Article

2. **Acupunct Med**. 2018 Mar 26. pii: acupmed-2017-011547. doi: 10.1136/acupmed-2017-011547. [Epub ahead of print]
Acupuncture in the emergency department: a systematic review of randomised controlled trials.
Chia KL1, Lam RPK2, Lam CK3, Tsui SH4.
Abstract
INTRODUCTION: A comprehensive review of both English and Chinese language literature to inform acupuncture practice in emergency department (ED) settings is lacking. Accordingly, we aimed to conduct a systematic review of English and Chinese randomised controlled trials (RCTs) of acupuncture use in the ED.
METHODS: Four English databases (Embase, PubMed, AMED and CENTRAL) and two Chinese databases (CNKI and Wanfang) were systematically searched using the keywords 'acupuncture' and 'emergency department', followed by a bibliographic search of references. The data were extracted and assessed by two independent authors. RCTs were selected based on pre-defined criteria. Data were extracted and a risk of bias assessment was performed using the Cochrane risk of bias tool. The quality of evidence was rated using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach.
RESULTS: In total, 1461 articles were screened and six RCTs involving 651 patients were included. For various acute pain conditions, acupuncture was superior to sham acupuncture, more effective than intravenous morphine, comparable to conventional ED treatment, and superior to standard ED care alone when used on an adjuvant basis; however, the overall level of evidence was low. Studies that applied acupuncture in hypertension and cardiac arrest were deemed to be at high risk of bias, and the level of evidence for these outcomes was very low. No major adverse events were reported in the included studies.
CONCLUSION: There is a lack of high-quality evidence to support the use of acupuncture in the ED. Multicentre RCTs with rigorous designs are warranted.

3. **Resuscitation**. 2018 Mar 23. pii: S0300-9572(18)30138-2. doi: 10.1016/j.resuscitation.2018.03.028. [Epub ahead of print]
Prediction of Survival in Accidental Hypothermia Requiring Extracorporeal Life Support: An Individual Patient Data Meta-Analysis.
Saczkowski RS1, Brown DJA2, Abu-Laban RB3, Fradet G4, Schulze CJ5, Kuzak ND6.

Abstract
BACKGROUND: Extra-corporeal life support (ECLS) is a life-saving intervention for patients with hypothermia induced cardiac arrest or severe cardiovascular instability. However, its application is highly variable due to a paucity of data in the literature to guide practice. Current guidelines and recommendations are based on expert opinion, single case reports, and small case series. Combining all of the published data in a patient-level analysis can provide a robust assessment of the influence of patient characteristics on survival with ECLS.
OBJECTIVE: To develop a prediction model of survival with good neurologic outcome for accidental hypothermia treated with ECLS.
METHODS: Electronic searches of PubMed, EMBASE, CINAHL were conducted with a hand search of reference lists and major surgical and critical care conference abstracts. Studies had to report the use of ECLS configured with a circuit, blood pump and oxygenator with an integrated heat exchanger. Randomized and observational studies were eligible for inclusion. Non-human, non-English and review manuscripts were deemed ineligible. Study authors were requested to submit patient level data when aggregate or incomplete individual patient data was provided in a study. Survival with good neurologic outcome was categorized for patients to last follow-up based on the reported scores on the Cerebral Performance Category (1 or 2), Glasgow Outcome Scale (4 or 5) and Pediatric Overall Performance Category (1 or 2). A one-stage, individual patient data meta-analysis was performed with a mixed-effects multi-level logistic regression model reporting odds ratio (OR) with a 95% confidence interval (CI).
RESULTS: Data from 44 observational studies and 40 case reports (n = 658) were combined and analyzed to identify independent predictors of survival with good neurologic outcome. The survival rate with good neurologic outcome of the entire cohort was 40.3% (265 of 658). ECLS rewarming rate (OR: 0.93; 95% CI: 0.88, 0.98; p = 0.007), female gender (OR: 2.78; 95% CI: 1.69, 4.58; p < 0.001), asphyxiation (OR: 0.19; 95% CI: 0.11, 0.35; p < 0.001) and serum potassium (OR: 0.62; 95% CI: 0.53, 0.73; p < 0.001) were associated with survival with a good neurologic outcome. The logistic regression model demonstrated excellent discrimination (c-statistic: 0.849; 95% CI: 0.823, 0.875).
CONCLUSIONS: The use of extracorporeal life support in the treatment of hypothermic cardiac arrest provides a favourable chance of survival with good neurologic outcome. When used in a weighted scoring system, asphyxiation, serum potassium and gender can help clinicians prognosticate the benefit of resuscitating hypothermic patients with ECLS.

CAUSES DE L'ACR

1. **Clin Nutr ESPEN**. 2018 Apr;24:47-53. doi: 10.1016/j.clnesp.2018.01.071. Epub 2018 Feb 17.
The impact of body mass index on post resuscitation survival after cardiac arrest: A meta-analysis.
Kakavas S1, Georgiopoulos G2, Oikonomou D3, Karayiannis D4 , Masi S5, Karlis G6, Xanthos T7.
Abstract
BACKGROUND: Observational studies examining the association between body mass index (BMI) and the outcome of cardiac arrest (CA) shows controversial results.
METHODS: We reviewed literature for studies assessing the impact of BMI on survival and neurological outcome following CA. Eligible studies were subsequently meta-analyzed and pooled odds ratios and their corresponding 95% confidence intervals for post CA survival and neurological status were derived.
RESULTS: A total of 7 studies with 24,651 patients were evaluable for this meta-analysis. The studies were also categorized by location of the CA and the use of therapeutic hypothermia. Our results suggested that BMI between 25 and 29.9 kgr/m2 had a favorable impact on survival after CA (OR = 1.172, 95% CI, 1.109-1.236) in comparison to normal weight subjects. Likewise, overweight patients presented increased odds for a favorable neurological outcome after CA (OR = 1.112, 95% CI, 1.020-1.213). On the contrary, underweight subjects presented decreased

odds of surviving after CA as compared to normal BMI subjects (OR = 0.781, 95% CI, 0.652-0.935). Finally, BMI >30 kgr/m2 was not associated with improved survival or neurological outcome as compared to BMI 18.5-24.9 kgr/m2.
CONCLUSIONS: Overweight patients have a favorable prognosis after CA in terms of both survival and neurological outcome. This effect was amplified when the analysis is restricted in in-hospital cardiac arrest and in patients non-treated with therapeutic hypothermia.

DONACIÓ D'ÒRGANS

1. **Transplant Proc**. 2018 Mar;50(2):530-532. doi: 10.1016/j.transproceed.2017.09.074.
Short-term Results From a Training Program to Improve Organ Donation in Uncontrolled Donation After Circulatory Death.
Egea-Guerrero JJ1, Martín-Villén L2, Ruiz de Azúa-López Zaida Z3, Bonilla-Quintero Francisco F4, Pérez-López Enrique E5, Marín-Andrés R6, Correa-Chamorro E2, Vilches-Arenas Á7.
Abstract
BACKGROUND: In all organ transplantation programs, election of the proper protocol relies primarily on the professionals involved in the detection of potential donors. The objective of our study was to assess the impact of a series of prehospital training sessions, as well as to develop several positive feedback strategies within the uncontrolled organ donation after circulatory death (uDCD) program in our city.
METHODS: A before-after intervention study was carried out in 3 steps. First, professionals enrolled in the Emergency Health Services Agency-061 (EPES-061) program underwent specific training to identify potential donors. Second, a specific logotype was designed to alert emergency health care professionals that in cases where cardiopulmonary resuscitation was ineffective and after treatment of all potentially reversible causes, the "chain of survival" should be considered a "chain of opportunities." Third, a positive feedback strategy was put in place, whereby each time a donation was procured, the EPES-061 personnel that had identified the potential donor were notified by phone and in a personal letter.
RESULTS: The mean age for donors was 50.5 years of age (interquartile range 37-52.5), and 89.5% of all donations came from male subjects. Positive feedback letters and phone calls, including information on final outcome, were provided to the appropriate personnel in 100% of the cases. Postintervention information showed an increase in both eligible and utilized donors.
CONCLUSIONS: Interventions outside the hospital setting that facilitate optimal implementation of the uDCD program are an essential part of this strategy to increase the donor pool and make the wait shorter for transplant patients.

MONITORATGE CEREBRAL

1. **Resuscitation**. 2018 Mar 23. pii: S0300-9572(18)30141-2. doi: 10.1016/j.resuscitation.2018.03.031. [Epub ahead of print] Cerebral saturation in cardiac arrest patients measured with near-infrared technology during pre-hospital advanced life support. Results from Copernicus I cohort study.
Genbrugge C1, De Deyne C2, Eertmans W3, Kurt A4, Dirk V5, Ilse M6, Marc S7, Jan S8, Liesbeth B9, Dieter M10, Jans F11, Boer W12, Dens J13.
Abstract
AIM: To date, monitoring options during pre-hospital advanced life support (ALS) are limited. Regional cerebral saturation (rSO2) may provide more information concerning the brain during ALS. We hypothesized that an increase in rSO2 during ALS in out-of hospital cardiac arrest (OHCA) patients is associated with return of spontaneous circulation (ROSC).
METHODS: A prospective, non-randomized multicenter study was conducted in the pre-hospital setting of six hospitals in Belgium. Cerebral saturation was measured during pre-hospital ALS by a medical emergency team in OHCA patients. Cerebral saturation was continuously measured

until ALS efforts were terminated or until the patient with sustained ROSC (>20 minutes) arrived at the emergency department. To take the longitudinal nature of the data into account, a linear mixed model was used. The correlation between the repeated measures of a patient was handled by means of a random intercept and a random slope. Our primary analysis tested the association of rSO2 with ROSC.
RESULTS: Of the 329 patients 110 (33%) achieved ROSC. First measured rSO2 was 30% ± 18 in the ROSC group and 24% ± 15 in the no-ROSC group ($p = 0.004$; mean ± SD). Higher mean rSO2 values were observed in the ROSC group compared to the no-ROSC group (41% ± 13 versus 33% ± 13 respectively; $p < 0.001$). The median increase in rSO2, measured from start until two minutes before ROSC, was higher in the ROSC group (ROSC group 17% (IQR 6-29)) than in the no-ROSC group (8% (IQR 2-13); $p < 0.001$). An increase in rSO2 above 15% was associated with ROSC (OR 4.5; 95%CI 2.747-7.415; $p < 0.001$).
CONCLUSION: Regional cerebral saturation measurements can be used during pre-hospital ALS as an additional marker to predict ROSC. An increase of at least 15% in rSO2 during ALS is associated with a higher probability of ROSC.

TRAUMA

1**. Rev Col Bras Cir.** 2018 Mar 26;45(1):e1709. doi: 10.1590/0100-6991e-20181709.
Resuscitative endovascular balloon occlusion of the aorta (REBOA): an updated review.
[Article in English, Portuguese]
Ribeiro Júnior MAF1, Brenner M2, Nguyen ATM3, Feng CYD3, DE-Moura RR1, Rodrigues VC1, Prado RL1.
Abstract
In a current scenario where trauma injury and its consequences account for 9% of the worlds causes of death, the management of non-compressible torso hemorrhage can be problematic. With the improvement of medicine, the approach of these patients must be accurate and immediate so that the consequences may be minimal. Therefore, aiming the ideal method, studies have led to the development of Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA). This procedure has been used at select trauma centers as a resuscitative adjunct for trauma patients with non-compressible torso hemorrhage. Although the use of this technique is increasing, its effectiveness is still not clear. This article aims, through a detailed review, to inform an updated view about this procedure, its technique, variations, benefits, limitations and future.
Free Article

2. **Eur J Trauma Emerg Surg**. 2018 Mar 23. doi: 10.1007/s00068-018-0947-2. [Epub ahead of print]
Could resuscitative endovascular balloon occlusion of the aorta improve survival among severely injured patients with post-intubation hypotension?
Manzano-Nunez R1,2, Herrera-Escobar JP3, DuBose J4, Hörer T5,6, Galvagno S7, Orlas CP8,9, Parra MW10, Coccolini F11, Sartelli M12, Falla-Martinez JC8, García AF9, Chica J8,9, Naranjo MP8, Sanchez AI8,9, Salazar CJ 13, Calderón-Tapia LE8, Lopez-Castilla V13, Ferrada P14, Moore EE15, Ordonez CA9.
Abstract
Current literature shows the association of post-intubation hypotension and increased odds of mortality in critically ill non-trauma and trauma populations. However, there is a lack of research on potential interventions that can prevent or ameliorate the consequences of endotracheal intubation and thus improve the prognosis of trauma patients with post-intubation hypotension. This review paper hypothesizes that the deployment of REBOA among trauma patients with PIH, by its physiologic effects, will reduce the odds of mortality in this population. The objective of

this paper is to review the current literature on REBOA and post-intubation hypotension, and, furthermore, to provide a rational hypothesis on the potential role of REBOA in severely injured patients with post-intubation hypotension.

FÀRMACS

1. **Methods Enzymol**. 2018;602:273-288. doi: 10.1016/bs.mie.2018.01.010. Epub 2018 Feb 27.
Methods for Defining the Neuroprotective Properties of Xenon.
Robel R1, Caroccio P1, Maze M2.
Abstract
Xenon has features that make it an ideal general anesthetic agent; cost and scarcity mitigate xenon's widespread use in the operating room. Discovery of xenon's cytoprotective properties resulted in its application to thwart ongoing acute neurologic injury, an unmet clinical need. The discovery that xenon's neuroprotective effect interacts synergistically with targeted temperature management (TTM) led to its investigation in clinical settings, including in the management of the postcardiac arrest syndrome, in which TTM is indicated. Following successful demonstration of xenon's efficacy in combination with TTM in a preclinical model of porcine cardiac arrest, xenon plus TTM was shown to significantly decrease an imaging biomarker of brain injury for out of hospital cardiac arrest victims that had been successfully resuscitated. With the development of an efficient delivery system the stage is now set to investigate whether xenon improves survival, with good clinical outcome, for successfully resuscitated victims of a cardiac arrest

ORGANITZACIÓ I ENTRENAMENT

1. **Crit Care Med.** 2018 Mar 29. doi: 10.1097/CCM.0000000000003126. [Epub ahead of print]
Increasing the Number of Medical Emergency Calls Does Not Improve Hospital Mortality.
Santamaria J1, Moran J2, Reid D1.
Abstract
OBJECTIVES: Medical emergency teams were established to rescue patients experiencing clinical deterioration thus preventing cardiac arrest and unexpected hospital mortality. Although hospitals are encouraged to increase emergency calling rates to improve in-hospital mortality, there are increasing concerns about the impact these calls have on the workload of the teams and the skill levels on the general wards. We set out to examine the relationship between emergency calling rates and adjusted in-hospital mortality.
DESIGN: Retrospective analysis of prospectively collected patient and emergency call data.
SETTING: Tertiary, metropolitan, and regional hospitals in the State of Victoria, Australia.
PATIENTS: Consecutive patients discharged from 1) St Vincent's Hospital Melbourne from January 2008 to June 2016 and 2) 15 Victorian hospitals from July 2010 to June 2015.
MEASUREMENTS AND MAIN RESULTS:
We studied 441,029 patients from St Vincent's Hospital Melbourne. Median age was 61.0 years (interquartile range, 45-74 yr), 57.2% were men, and 0.70% died; monthly emergency calling rates varied between 9.21 and 30.69 (median 18.4) per 1,000 discharges. In-hospital mortality adjusted for age, gender, emergency status, same day admission, year of discharge, and Charlson Comorbidity Index was not reduced by higher calling rates in the month of discharge (odds ratio, 1.019; 95% CI, 1.008-1.031). We then examined 3,339,789 discharges from 15 Victorian hospitals with median age 61 years (interquartile range, 43-74 yr), 51.4% men, and hospital mortality 0.83% where yearly emergency calling rates varied from 18.46 to 33.40 (median, 25.75) per 1,000 discharges. Again, adjusted mortality was not reduced by higher calling rates in the year of discharge (odds ratio, 1.003; 95% CI, 1.001-1.006).

CONCLUSIONS: With adjustment for patient factors, illness, and comorbidities, increased emergency calling rates were not associated with reduced in-hospital mortality. Efforts to increase calling rates do not seem warranted.

2**. World J Emerg Med**. 2018;9(2):93-98. doi: 10.5847/wjem.j.1920-8642.2018.02.002.
The Emergency Department Crash Cart: A systematic review and suggested contents.
Jacquet GA1, Hamade B2, Diab KA3, Sawaya R4, Dagher GA4, Hitti E4, Bayram JD2.
Abstract
BACKGROUND: As the field of Emergency Medicine grows worldwide, the importance of an Emergency Department Crash Cart (EDCC) has long been recognized. Yet, there is paucity of relevant peer-reviewed literature specifically discussing EDCCs or proposing detailed features for an EDCC suitable for both adult and pediatric patients.
METHODS: The authors performed a systematic review of EDCC-specific literature indexed in Pubmed and Embase on December 20, 2016. In addition, the authors reviewed the 2015 American Heart Association (AHA) guidelines for cardiopulmonary resuscitation and emergency cardiovascular care, the 2015 European Resuscitation Council (ERC) guidelines for resuscitation, and the 2013 American College of Surgeons (ACS) Advanced Trauma Life Support (ATLS) 9th edition.
RESULTS: There were a total of 277 results, with 192 unique results and 85 duplicates. After careful review by two independent reviewers, all but four references were excluded. None of the four included articles described comprehensive contents of equipment and medications for both the adult and pediatric populations. This article describes in detail the final four articles specific to EDCC, and proposes a set of suggested contents for the EDCC.
CONCLUSION: Our systematic review shows the striking paucity of such a high impact indispensable item in the ED. We hope that our EDCC content suggestions help enhance the level of response of EDs in the resuscitation of adult and pediatric populations, and encourage the implementation of and adherence to the latest evidence-based resuscitation guidelines.
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CURES POSTRESSUSCITACIÓ

1**. Open Med (Wars).** 2018 Mar 15;13:35-40. doi: 10.1515/med-2018-0006. eCollection 2018.
Value of Continuous Video EEG and EEG Responses to Thermesthesia Stimulation in Prognosis Evaluation of Comatose Patients after Cardiopulmonary Resuscitation.
Jianmin Q1, Xueliang Y1, Liqin L1, Yongsheng W1, Licang H2, Yuanxin H2.
Abstract
Objective: To investigate the clinical value of video-electroencephalography (VEEG) and thermal stimulus on evaluating the prognosis of comatose patients after cardiopulmonary resuscitation.
Methods: Twenty eight comatose patients with cardiopulmonary resuscitation were included in the department of ICU of the First Teaching Hospital of Fujian Medical University from February 2013 to March 2016. Of the included 28 patients, 20 cases died (death group) and 8 cases survived (survival group) after cardiopulmonary resuscitation. The VEEG, Glasgow Coma Scale (GCS) and APACHE II score were recorded and compared between the death and survival group. The prediction value of death for VEEG, GCS and APACHE II were evaluated through sensitivity, specificity and area under the receiver operating characteristic (ROC) curve (AUC).
Results: GCS and APACHEH II score were statistical different between the death and survival group ($P<0.05$). With the increase of VEEG grading, the mortality rate of patients increased significantly ($P<0.05$). Predicting value of mortality for GCS, VEEG and APACHEH II were 57.69%, 61.54% and 71.43% respectively without statistical difference ($P>0.05$). The death prediction sensitivity and specificity for GCS were 67.0% and 85.0%, for APACHEH II were 95.1% and 85.0%, for VEEG were 100.0% and 85.2%. VEEG has the highest sensitivity, Specificity, coincidence rate and Kappa vale compared to GCS, and APACHEH II.

Conclusion: Video-electroencephalography is a useful tool for predicting the death risk for patients who received cardiopulmonary resuscitation.
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TARGET TEMPERATURE MANAGEMENT

1. **Ther Hypothermia Temp Manag**. 2018 Mar 26. doi: 10.1089/ther.2017.0049. [Epub ahead of print] Is It Feasible and Safe to Wake Cardiac Arrest Patients Receiving Mild Therapeutic Hypothermia After 12 Hours to Enable Early Neuro-Prognostication? The Therapeutic Hypothermia and Early Waking Trial Protocol.
Watson N1,2, Potter M1, Karamasis G1,2, Damian M3, Pottinger R4, Clesham G1,2, Gamma R1, Aggarwal R1, Sayer J1, Robinson N1, Jagathesan R1, Kabir A1, Tang K1, Kelly P1, Maccaroni M1, Kadayam R1, Nalgirkar R1, Namjoshi G1, Urovi S1, Pai A1, Waghmare K1, Caruso V1, Hampton-Till J2, Noc M5, Davies JR1,2, Keeble TR1,2.
Abstract
Mild therapeutic hypothermia (MTH 33°C) post out-of-hospital cardiac arrest (OHCA) is widely accepted as standard of care. However, uncertainty remains around the dose and therapy duration. OHCA patients are usually kept sedated±paralyzed and ventilated for the first 24-36 hours, which allows for targeted temperature management, but makes neurological prognostication challenging. The aim of this study is to investigate the feasibility and safety of assessing the unconscious OHCA patient after 12 hours for early waking/extubation while continuing to provide MTH for 24 hours, and fever prevention for 72 hours by using an intravenous temperature management (IVTM) system and established conscious MTH anti-shiver regimens. This is a single-center, prospective, non-randomized observational study that will compare the results of early awakening (at 12 hours) with historical controls. A total of 50 consecutive unconscious survivors of OHCA, treated with MTH, who meet the Therapeutic Hypothermia and eArly Waking (THAW) inclusion criteria will be enrolled. The patient will receive MTH by using IVTM. After 12 hours of MTH, patients will be assessed by using strict clinical criteria to determine suitability for early waking and extubation. Once awake and extubated, MTH will continue for 24 hours with skin counter-warming and anti-shiver regimen followed fever prevention up to 72 hours. All patients will have serial electroencephalogram (EEG), somatic sensory potential, and neuro-biomarkers performed on admission to intensive care unit, 6 and 12 hours, then every 24 hours until 72 hours. The study has been approved by the National Research Ethics Service, Health Research Authority.

ELECTROFISIOLOGIA

1. J Formos Med Assoc. 2018 Mar 24. pii: S0929-6646(17)30632-0. doi: 10.1016/j.jfma.2018.02.006. [Epub ahead of print] The utilization of automated external defibrillators in Taiwan.
Wang TH1, Wu HW2, Hou PC3, Tseng HJ4.
Abstract
BACKGROUND: Increasing attention to care of patient succumbed to out-of-hospital cardiac arrest (OHCA) and evidence for improved survival have resulted in many countries to encourage the use automated external defibrillators (AEDs) by legislation. In Taiwan, the amendment of the Emergency Medical Services Act mandated the installation of AEDs in designated areas in 2013. Since then, 6151 AEDs have been installed and registered in mandated and non-mandated locations. The purpose of this study was to investigate the utilization of AEDs at mandated and non-mandated locations.
METHODS: This paper analyzed 217 cases in whom AEDs was used between July 11, 2013 and July 31, 2015. Descriptive statistics were used to analyze the data.

RESULTS: The highest frequency of AEDs used was in long-term care facilities, accounting for 34 (15.7%) cases. The second and third highest was in schools and commuting stations. The highest utilization rate of registered AED was in long-term care facilities (73.9%), the second was in residential areas, and the third was in hot spring areas. Employees at the designated locations or medical personnel operated the AED in 143 cases (84.6%), and bystanders, relatives, friends or others operated the AEDs in 26 cases (15.4%). On-site Return of Spontaneous Circulation (ROSC) after applying AEDs occurred in 76 cases (45.8%).
CONCLUSIONS: Long-term care facilities had the highest utilization of AEDs and government should pay more attention to enforce the installing of AEDs in these places. The government also needs to promote the education public on how to search the AEDs locations.

ECMO

1. **Anaesthesiol Intensive** Ther. 2017;49(2):106-109. doi: 10.5603/AIT.2017.0029.
Difficulties in funding of VA-ECMO therapy for patients with severe accidental hypothermia.
Kosiński S, Darocha T1, Jarosz A, Czerw A, Podsiadło P, Sanak T, Gałązkowski R, Piątek J, Konstanty-Kalandyk J, Ziętkiewicz M, Kusza K, Krzych ŁJ, Drwiła R.
Abstract
BACKGROUND: Severe accidental hypothermia is defined as a core temperature below 28 Celsius degrees. Within the last years, the issue of accidental hypothermia and accompanying cardiac arrest has been broadly discussed and European Resuscitation Council (ERC) Guidelines underline the importance of Extracorporeal Rewarming (ECR) in treatment of severely hypothermic victims. The study aimed to evaluate the actual costs of ECR with VA-ECMO and of further management in the Intensive Care Unit of patients admitted to the Severe Accidental Hypothermia Centre in Cracow, Poland.
METHODS: We carried out the economic analysis of 31 hypothermic adults in stage III-IV (Swiss Staging) treated with VA ECMO. Twenty-nine individuals were further managed in the Intensive Care Unit. The actual treatment costs were evaluated based on current medication, equipment, and dressing pricing. The costs incurred by the John Paul II Hospital were then collated with the National Health Service (NHS) funding, assessed based on current financial contract.
RESULTS: In most of the cases, the actual treatment cost was greater than the funding received by around 10000 PLN per patient. The positive financial balance was achieved in only 4 (14%) individuals; other 25 cases (86%) showed a financial loss.
CONCLUSION: Performed analysis clearly shows that hospitals undertaking ECR may experience financial loss due to implementation of effective treatment recommended by international guidelines. Thanks to new NHS funding policy since January 2017 such loss can be avoided, what shall encourage hospitals to perform this expensive, yet effective method of treatment.
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PEDIATRIA

1. **Resuscitation**. 2018 Mar 27. pii: S0300-9572(18)30144-8. doi: 10.1016/j.resuscitation.2018.03.034. [Epub ahead of print]
Burden of Caregiving after a Child's In-Hospital Cardiac Arrest.
Meert K1, Slomine BS2, Christensen JR2, Telford R3, Holubkov R3, Dean JM3, Moler FW4.
Abstract
OBJECTIVE: To describe caregiver burden among those whose children survive in-hospital cardiac arrest and have high risk of neurologic disability, and explore factors associated with burden during the first year post-arrest.
METHODS: The study is a secondary analysis of the Therapeutic Hypothermia after Paediatric Cardiac Arrest In-Hospital (THAPCA-IH) trial. 329 children who had an in-hospital cardiac arrest,

chest compressions for >2 minutes, and mechanical ventilation after return of circulation were recruited to THAPCA-IH. Of these, 155 survived to one year, and caregivers of 138 were assessed for burden. Caregiver burden was assessed at baseline, and 3 and 12 months post-arrest using the Infant Toddler Quality of Life Questionnaire for children <5 years old and the Child Health Questionnaire for children >5 years. Child functioning was assessed using the Vineland Adaptive Behaviour Scales Second Edition (VABS-II), the Paediatric Overall Performance Category (POPC) and Paediatric Cerebral Performance Category (PCPC) scales, and caregiver perception of global functioning.
RESULTS: Of 138 children, 77 (55.8%) were male, 77 (55.8%) were white, and 109 (79.0%) were <5 years old at the time of arrest. Caregiver burden was greater than reference norms at all time points. Worse POPC, PCPC and VABS-II scores at 3 months post-arrest were associated with greater caregiver burden at 12 months. Worse global functioning at 3 months was associated with greater burden at 12 months for children <5 years.
CONCLUSIONS: Caregiver burden is substantial during the first year after paediatric in-hospital cardiac arrest, and associated with the extent of the child's neurobehavioural dysfunction.

2. **Resuscitation**. 2018 Mar 22. pii: S0300-9572(18)30139-4. doi: 10.1016/j.resuscitation.2018.03.029. [Epub ahead of print]

Resuscitation registers: how many active registers are there and how many collect data on paediatric cardiac arrests?

Booth A1, Moylan A2, Hodgson J3, Wright K4, Langworthy K5, Shimizu N6, Maconochie I7.

Abstract

BACKGROUND: Cardiac arrest, particularly in children, often has a poor outcome and international guidelines highlight significant gaps in the evidence base for effective resuscitation. Whilst randomised controlled trials for some interventions can be justified, they are not appropriate for many aspects of resuscitation. Therefore, guidelines must use other sources of data such as epidemiological evidence from cardiac arrest registries, to improve the efficacy of resuscitation. The aim of our study was to identify existing national cardiac arrest registries and document key information about the registries, including whether they contain data on paediatric arrests.
METHODS: Key bibliographic databases were searched for papers about or using data from cardiac arrest registries. Two reviewers independently screened the search results for relevant papers. A list of registers named in the papers was compiled and information obtained from the papers and the websites of registers where possible.
RESULTS: Twenty three active national or large regional cardiac arrest registries were identified. These included five international collaborations and 10 registries that cover a population of at least 10 million people. Twelve registries are based in Europe, five in North America, four in Asia and two in Australasia. The registries vary in their organisation, but the majority (20) defer to the Utstein reporting guidelines for cardiac arrest. Registries covered populations between 0.4 and 174.5 million and contained between 100 and 605,505 records. Sixteen collected data on out-of-hospital arrests only; three in-hospital arrests only; and four included both. For ten registers the number of paediatric arrests was available and ranged from 56 to 3,900.
CONCLUSIONS: To our knowledge this report contains the most complete list of active national and large regional cardiac arrest registries. Register data support current guidelines on effective resuscitation however, even the largest registries include relatively small numbers, particularly of paediatric events. A less fragmented approach has the potential to improve the utility of registration data for the benefit of patients.

RECERCA EXPERIMENTAL

1. **Interact Cardiovasc Thorac Surg**. 2018 Mar 26. doi: 10.1093/icvts/ivy076. [Epub ahead of print]

On-pump transapical cardioscopic mitral valve replacement with cardiac arrest: short-term results in a porcine survival model.

Vu TD1, Nguyen DV1, Oo MZ1, Alaa M1, Ocampo EM1, Cheyyatraivendran Arularasu S1, Wai Win P1, Ja'afar N1, Si-Guim G2, Ong P2, Ti LK3, Richards AM4, Kofidis T1,2,4.

Abstract

OBJECTIVES: Favourable outcomes with mitral annuloplasty have been achieved with transapical cardioscopic (TAC) surgery in a survival animal model. In addition, experimental TAC on a non-survival animal model also showed adequate access to remove the native mitral valve and implant a prosthetic valve, but the surgical procedure took a long time and lacked follow-up data. The goal of this study was to develop a clinically translatable TAC mitral valve replacement (MVR) procedure using technical and instrumental refinements to reduce the surgical time and to evaluate functional recovery and short-term durability using a survival porcine model. We hypothesized that MVR could be achieved with subannular implantation of the bioprosthesis via the TAC approach.

METHODS: TAC MVR using the Hancock II™ (Medtronic)® mitral prosthesis was performed in 6 pigs via an incision over the xiphoid process, under cardiopulmonary bypass and cardiac arrest. COR-KNOT® and minimally invasive cardiac surgery instruments were used. Haemodynamics, echocardiography, cardiac computed tomography, ventriculography and electrocardiography were used to evaluate the function of the mitral prosthesis and left ventricle, coronary system and conduction system in the perioperative period and 4 weeks later.

RESULTS: A postimplant examination showed that the mitral prosthesis was competent, without a paravalvular leak. The left ventricular ejection fraction was comparable to preoperative values (65.2 ± 4.1 vs 67.2 ± 7.9). The bypass, cross-clamp and implant times were 177.2 ± 44.2 min, 135.3 ± 47.6 min and 94.0 ± 41.2 min, respectively. The prosthesis was in a good position. The apical scar was intact and not aneurysmal 4 weeks after the implant. The valve was properly sutured to the annulus, without a postimplant paravalvular leak. All animals recovered after 1 month of follow-up with preserved ventricular function and normal wall motion.

CONCLUSIONS: We successfully managed to replace the mitral valve with a biological prosthesis via the apex with encouraging bypass and cross-clamp times. This technique may provide an alternative for a selected group of patients with diseased mitral valves who have indications for MVR and still in a high-risk redo setting with conventional sternotomy or minimally invasive cardiac surgery-MVR.

2. **J Am Heart Assoc**. 2018 Mar 23;7(6). pii: e006573. doi: 10.1161/JAHA.117.006573.

Decreased cAMP Level and Decreased Downregulation of β1-Adrenoceptor Expression in Therapeutic Hypothermia-Resuscitated Myocardium Are Associated With Improved Post-Resuscitation Myocardial Function.

Wang W1,2, Hua T1,2, Li H2, Wu X2, Bradley J2, Peberdy MA2,3, Ornato JP2,4, Tang W5,4,6.

Abstract

BACKGROUND: Epinephrine administered during cardiopulmonary resuscitation (CPR) is associated with severe post-resuscitation myocardial dysfunction. We previously demonstrated that therapeutic hypothermia reduced the severity of post-resuscitation myocardial dysfunction caused by epinephrine; however, the relationship between myocardial adrenoceptor expression and myocardial protective effects by hypothermia remains unclear.

METHODS AND RESULTS: Rats weighing between 450 and 550 g were randomized into 5 groups: (1) normothermic placebo, (2) normothermic epinephrine, (3) hypothermic placebo, (4) hypothermic epinephrine, and (5) sham (not subject to cardiac arrest and resuscitation). Ventricular fibrillation was induced and untreated for 8 minutes for all other groups. Hypothermia was initiated coincident with the start of CPR and maintained at 33±0.2°C for 4 hours. Placebo or epinephrine was administered 5 minutes after the start of CPR and 3 minutes

before defibrillation. Post-resuscitation ejection fraction was measured hourly for 4 hours then hearts were harvested. Epinephrine increased coronary perfusion pressure during CPR (27±6 mm Hg versus 21±2 mm Hg P<0.05). Post-resuscitation myocardial function was impaired in the normothermic epinephrine group compared with other groups. The concentration of myocardial cAMP doubled in the normothermic epinephrine group (655.06±447.63 μmol/L) compared with the hypothermic epinephrine group (302.51±97.98 μmol/L; P<0.05). Myocardial β1-adrenoceptor expression decreased with normothermia cardiac arrest but not with hypothermia regardless of epinephrine.
CONCLUSIONS: Epinephrine, administered during normothermic CPR, increased the severity of post-resuscitation myocardial dysfunction. This adverse effect was inhibited by intra-arrest hypothermia resuscitation. Declined cAMP with more preserved β1-adrenoceptors in hypothermia-resuscitated myocardium is associated with improved post-resuscitated myocardial function in vivo.

CASE REPORTS

1. Clin Res Cardiol. 2018 Mar 26. doi: 10.1007/s00392-018-1233-3. [Epub ahead of print] Unexplained cardiac arrest: a tale of conflicting interpretations of KCNQ1 genetic test results.
Chua HC1, Servatius H2, Asatryan B2, Schaller A3, Rieubland C3, Noti F2, Seiler J2, Roten L2, Baldinger SH2, Tanner H2, Fuhrer J2, Haeberlin A2,4, Lam A2, Pless SA1, Medeiros-Domingo A5.
Abstract
OBJECTIVE: Unexplained cardiac arrest (UCA) is often the first manifestation of an inherited arrhythmogenic disease. Genetic testing in UCA is challenging due to the complexities of variant interpretation in the absence of supporting cardiac phenotype. We aimed to investigate if a KCNQ1 variant [p.(Pro64_Pro70del)], previously reported as pathogenic, contributes to the long-QT syndrome phenotype, co-segregates with disease or affects KCNQ1 function in vitro.
METHODS: DNA was extracted from peripheral blood of a 22-year-old male after resuscitation from UCA. Targeted exome sequencing was performed using the TruSight-One Sequencing Panel (Illumina). Variants in 190 clinically relevant cardiac genes with minor allele frequency < 1% were analyzed according to the guidelines of the American College of Medical Genetics. Functional characterization was performed using site-directed mutagenesis, expression in Xenopus laevis oocytes using the two-electrode voltage-clamp technique.
RESULTS: The 12-lead ECG, transthoracic echocardiography and coronary angiography after resuscitation showed no specific abnormalities. Two variants were identified: c.190_210del in-frame deletion in KCNQ1 (p.Pro64_Pro70del), reported previously as pathogenic and c.2431C > A in PKP2 (p.Arg811Ser), classified as likely benign. Two asymptomatic family members with no evident phenotype hosted the KCNQ1 variant. Functional studies showed that the wild-type and mutant channels have no significant differences in current levels, conductance-voltage relationships, as well as activation and deactivation kinetics, in the absence and presence of the auxiliary subunit KCNE1.
CONCLUSIONS: Based on our data and previous reports, available evidence is insufficient to consider the variant KCNQ1:c.190_210del as pathogenic. Our findings call for cautious interpretation of genetic tests in UCA in the absence of a clinical phenotype.

2. **Wilderness Environ Med**. 2018 Mar 26. pii: S1080-6032(18)30047-4. doi: 10.1016/j.wem.2018.02.004. [Epub ahead of print]
Reported Resuscitation of a Hypothermic Avalanche Victim With Assisted Ventilation in 1939.
Zafren K1, Atkins D2, Brugger H3.
Abstract
We present a historical case of a 12-year-old boy who survived a reported avalanche burial in 1939 in the Upper Peninsula of Michigan. The boy was completely buried for at least 3 hours, head down, at a depth of about 1 m. He was extricated without signs of life and likely

hypothermic by his father, who took him to his home. There, the father performed assisted ventilation for 3 hours using the Schäfer method, a historical method of artificial ventilation, without any specific rewarming efforts. The boy recovered neurologically intact. This case illustrates the importance of attempting resuscitation, possibly prolonged, of victims of hypothermia, even those who are apparently dead.