This week's PubMed 9th – 15th October 2022: articles of interest n = 44

CPR AND COVID-19

1. J Clin Med. 2022 Oct 5;11(19):5881. doi: 10.3390/jcm11195881.
COVID-19 CPR-Impact of Personal Protective Equipment during a Simulated Cardiac Arrest in Times of the COVID-19 Pandemic: A Prospective Comparative Trial.
Sellmann T(1)(2), Nur M(3), Wetzchewald D(3), Schwager H(3), Cleff C(4), Thal SC(2), Marsch S(5).
ABSTRACT
Background: Guidelines of cardiopulmonary resuscitation (CPR) recommend the use of personal protective equipment (PPE) during the resuscitation of COVID-19 patients. Data on the effects of PPE on rescuers' stress level and quality of CPR are sparse and conflicting. This trial investigated the effects of PPE on team performance in simulated cardiac arrests. Methods: During the pandemic period, 198 teams (689 participants) performed CPR with PPE in simulated cardiac arrests (PPE group) and were compared with 423 (1451 participants) performing in identical scenarios in the pre-pandemic period (control group). Video recordings were used for data analysis. The primary endpoint was hands-on time. Secondary endpoints included a further performance of CPR and the perceived task load assessed by the NASA task-load index. Results: Hands-on times were lower in PPE teams than in the control group (86% (83-89) vs. 90% (87-93); difference 3, 95% CI for difference 3-4, p < 0.0001). Moreover, PPE teams made fewer change-overs and delayed defibrillation and administration of drugs. PPE teams perceived higher task loads (57 (44-67) vs. 63 (53-71); difference 6, 95% CI for difference 5-8, p < 0.0001) and scored higher in the domains physical and temporal demand, performance, and effort. Leadership allocation had no effect on primary and secondary endpoints. Conclusions: Having to wear PPE during CPR is an additional burden in an already demanding task. PPE is associated with an increase in perceived task load, lower hands-on times, fewer change-overs, and delays in defibrillation and the administration of drugs.

CPR/MECHANICAL CHEST COMPRESSION

1. Heart Lung. 2022 Oct 10;57:180-185. doi: 10.1016/j.hrtlng.2022.09.023. Online ahead of print.
Can support surfaces characteristics influence high-quality chest compression? manikin experiment with a mechanical device.
Vianna CA(1), Campos JF(2), de Oliveira HC(2), Machado DM(3), de Bakker GB(4), da Silva RC(2), Brandão MAG(2).
ABSTRACT
BACKGROUND: Support surfaces variables, such as size, material, and density, can determine chest compression depth in cardiopulmonary resuscitation. OBJECTIVE: to analyze the force required to do a high-quality chest compression concerning different surfaces in CPR. METHOD: This experimental study was developed using a Little Anne manikin and a mechanical device to perform chest compressions. Nine sets of surfaces were tested and compared to a control. RESULTS: 230 experimental tests were done in sets of bed or stretcher + mattress and presence or absence of different backboards. In the control condition, the average force to reach 5 cm of depth was 42.14±0.97 (kgf). Set 9, compatible with a narrow stretcher with a thin mattress, had the best surfaces to reach recommended depth, with or without a backboard. All other sets required significantly more force for high-quality chest compression. Regression analysis confirms that backboard size is not significant for the force for high-quality chest compression. CONCLUSION: There is an association of dimensions and types of beds or stretchers and mattresses with a force

increase. Type and dimensions of the backboard are not relevant for the force required, regardless of the characteristics of the set of the bed or stretcher and mattress.

2. Resuscitation. 2022 Oct 10:S0300-9572(22)00681-5. doi: 10.1016/j.resuscitation.2022.10.002. Online ahead of print.

The impact of alcohol use on the quality of cardiopulmonary resuscitation among festival attendees: A prespecified analysis of a randomised trial.

Nas J(1), Thannhauser J(2), Vart P(3), van Geuns R(2), Muijsers H(2), Mol J(2), Aarts G(2), Konijnenberg L(2), Gommans D(2), Ahoud-Schoenmakers S(2), Vos JL(2), van Royen N(2), Bonnes JL(2), Brouwer MA(2).

ABSTRACT

BACKGROUND: Cardiac arrests often occur in public places, but despite the undisputed impact of bystander CPR, it is debated whether one should act as a rescuer after alcohol consumption due to the perceived adverse effects. We provide the first objective data on the impact of alcohol levels on CPR-skills. METHODS: Pre-specified analysis of a randomised study at the Lowlands music festival (August 2019, the Netherlands) on virtual reality vs. face-to-face CPR-training. Participants with an alcohol level ≥0.5‰ (WHO-endorsed cut-off for traffic participation) were eligible provided they successfully completed a tandem gait test. We studied alcohol levels (AL, ‰) in relation to CPR-quality (compression depth and rate) and CPR-scenario performance. RESULTS: Median age of the 352 participants was 26 (22-31) years, 56% were female, with n=214 in Group 1 (AL= 0‰), n=85 in Group 2 (AL=0 to 0.5‰) and n=53 in Group 3 (AL≥0.5‰). There were no significant differences in CPR-quality (depth: 57 [49-59] vs. 57 [51-60] vs. 55mm [47-59], p=0.16; rate: 115 [104-121] vs. 114 [106-122] vs. 111min-1 [95-120], p=0.19). There were no significant correlations between alcohol level and compression depth (Spearman's rho -0.113, p=0.19) or rate (Spearman's rho -0.073, p=0.39). CPR-scenario performance scores (maximum 13) were not different between groups (12 (9-13) vs. 12 (9-13) vs. 11 (9-13), p=0.80). CONCLUSION: In this study on festival attendees, we found no association between alcohol levels and CPR-quality or scenario performance shortly after training.

REGISTRIES, REVIEWS AND EDITORIALS

1. Resusc Plus. 2022 Oct 6;12:100314. doi: 10.1016/j.resplu.2022.100314. eCollection 2022 Dec.

European Registry of Cardiac Arrest - Study-THREE (EuReCa THREE) - An international, prospective, multi-centre, three-month survey of epidemiology, treatment and outcome of patients with out-of-hospital cardiac arrest in Europe - The study protocol.

Wnent J(1)(2)(3), Masterson S(4), Maurer H(5), Tjelmeland I(1)(6)(7), Herlitz J(8), Rosell Ortiz F(9), Kurbach E(1)(10), Bossaert L(11)(12), Perkins G(12)(13)(14), Gräsner JT(1)(2)(12).

ABSTRACT

BACKGROUND: The aim of the European Registry of Cardiac Arrest (EuReCa) network is to provide high quality evidence on epidemiology of out-of-hospital cardiac arrest (OHCA) in Europe by supporting and developing cardiac arrest registries and performing European-wide studies. To date, the EuReCa ONE and EuReCa TWO studies have involved around 28 countries, with population covered increasing from the first to the second study. The aim of the EuReCa THREE study is to build on previous work and to support the promotion of quality data collection on OHCA throughout Europe. METHODS/DESIGN: EuReCa THREE will be the third prospective cohort study on epidemiology of OHCA and will involve around 30 European countries. The study will be conducted between 1st September and 30th November 2022. Data will be collected on cardiac arrest cases

attended, resuscitation attempted, patient and cardiac arrest event characteristics and outcomes (including return of spontaneous circulation, status on hospital arrival and discharge). A particular focus for EuReCa THREE will be to describe key time intervals in OHCA management; time from call to EMS arrival on scene, time from cardiac arrest to start CPR, time from EMS arrival to delivery of patient to hospital. EuReCa THREE was registered with the German Registry of Clinical Trials Registration Number: DRKS00028591 searchable via WHO meta-registry (https://apps.who.int/trialsearch/). DISCUSSION: The EuReCa THREE study will increase our knowledge on longitudinal OHCA epidemiology and provide new knowledge on crucial time intervals in OHCA management in Europe. However, the primary aim of building a network to support quality data on OHCA, remains the central tenant of the EuReCa project.

2. J Clin Med. 2022 Sep 28;11(19):5744. doi: 10.3390/jcm11195744.
The Role of Drones in Out-of-Hospital Cardiac Arrest: A Scoping Review.
Lim JCL(1), Loh N(1), Lam HH(1), Lee JW(2), Liu N(2)(3)(4), Yeo JW(1), Ho AFW(5)(6).
ABSTRACT
Drones may be able to deliver automated external defibrillators (AEDs) directly to bystanders of out-of-hospital cardiac arrest (OHCA) events, improving survival outcomes by facilitating early defibrillation. We aimed to provide an overview of the available literature on the role and impact of drones in AED delivery in OHCA. We conducted this scoping review using the PRISMA-ScR and Arksey and O'Malley framework, and systematically searched five bibliographical databases (Medline, EMBASE, Cochrane CENTRAL, PsychInfo and Scopus) from inception until 28 February 2022. After excluding duplicate articles, title/abstract screening followed by full text review was conducted by three independent authors. Data from the included articles were abstracted and analysed, with a focus on potential time savings of drone networks in delivering AEDs in OHCA, and factors that influence its implementation. Out of the 26 included studies, 23 conducted simulations or physical trials to optimise drone network configuration and evaluate time savings from drone delivery of AEDs, compared to the current emergency medical services (EMS), along with 1 prospective trial conducted in Sweden and 2 qualitative studies. Improvements in response times varied across the studies, with greater time savings in rural areas. However, emergency call to AED attachment time was not reduced in the sole prospective study and a South Korean study that accounted for weather and topography. With growing interest in drones and their potential use in AED delivery spurring new research in the field, our included studies demonstrate the potential advantages of unmanned aerial vehicle (UAV) network implementation in controlled environments to deliver AEDs faster than current EMS. However, for these time savings to translate to reduced times to defibrillation and improvement in OHCA outcomes, careful evaluation and addressing of real-world delays, challenges, and barriers to drone use in AED delivery is required.

IN-HOSPITAL CARDIAC ARREST

No articles identified.

INJURIES AND CPR

1. Open Access Emerg Med. 2022 Oct 4;14:557-562. doi: 10.2147/OAEM.S374785. eCollection 2022.
Traumatic Injuries Following Mechanical versus Manual Chest Compression.
Saleem S(1), Sonkin R(2), Sagy I(3)(4), Strugo R(2), Jaffe E(2), Drescher M(1)(5), Shiber S(1)(5).
ABSTRACT

OBJECTIVE: Survival after out-of-hospital cardiac arrest (OHCA) depends on multiple factors, mostly quality of chest compressions. Studies comparing manual compression with a mechanical active compression-depression device (ACD) have yielded controversial results in terms of outcomes and injury. The aim of the present study was to determine whether out-of-hospital ACD cardiopulmonary resuscitation (CPR) use is associated with more skeletal fractures and/or internal injuries than manual compression, with similar duration of cardiopulmonary resuscitation (CPR) between the groups. METHODS: The cohort included all patients diagnosed with out-of-hospital cardiac arrest (OHCA) at a tertiary medical center between January 2018 and June 2019 who achieved return of spontaneous circulation (ROSC). The primary outcome measure was the incidence of skeletal fractures and/or internal injuries in the two groups. Secondary outcome measures were clinical factors contributing to skeletal fracture/internal injuries and to achievement of ROSC during CPR. RESULTS: Of 107 patients enrolled, 45 (42%) were resuscitated with manual chest compression and 62 (58%) with a piston-based ACD device (LUCAS). The duration of chest compression was 46.0 minutes vs. 48.5 minutes, respectively (p=0.82). There were no differences in rates of ROSC (53.2% vs.50.8%, p=0.84), cardiac etiology of OHCA (48.9% vs.43.5%, p=0.3), major complications (ribs/ sternum fracture, pneumothorax, hemothorax, lung parenchymal damage, major bleeding), or any complication (20.5% vs.12.1%, p=0.28). On multivariate logistic regression analysis, factors with the highest predictive value for ROSC were cardiac etiology (OR 1.94;CI 2.00-12.94) and female sex (OR 1.94;CI 2.00-12.94). Type of arrhythmia had no significant effect. Use of the LUCAS was not associated with ROSC (OR 0.73;CI 0.34-2.1). CONCLUSION: This is the first study to compare mechanical and manual out-of-hospital chest compression of similar duration to ROSC. The LUCAS did not show added benefit in terms of ROSC rate, and its use did not lead to a higher risk of traumatic injury. ACD devices may be more useful in cases of delayed ambulance response times, or events in remote locations.

CAUSE OF THE ARREST

1. Aust J Rural Health. 2022 Oct;30(5):619-627. doi: 10.1111/ajr.12890. Epub 2022 Jun 15.
Higher rates but similar causes of young out-of-hospital cardiac arrest in rural Australian patients.
Paratz ED(1)(2)(3), van Heusden A(1), Smith K(4)(5)(6), Ball J(1)(4), Zentner D(7)(8), Morgan N(9), Thompson T(7), James P(7), Connell V(10), Pflaumer A(10)(11)(12), Semsarian C(13), Ingles J(14), Parsons S(9)(15), Stub D(2)(4)(6), La Gerche A(1)(2)(3).

ABSTRACT

OBJECTIVE: To determine whether young rural Australians have higher rates or different underlying causes of out-of-hospital cardiac arrest (OHCA). DESIGN: A case-control design identified patients experiencing an OHCA, then compared annual OHCA rates and underlying causes in rural versus metropolitan Victoria. OHCA causes were defined as either cardiac or non-cardiac, with specific aetiologies including coronary disease, cardiomyopathy, unascertained cause of arrest, drug toxicity, respiratory event, neurological event and other cardiac and non-cardiac. For OHCAs with confirmed cardiac aetiology, cardiovascular risk profiles were compared. SETTING: A state-wide prospective OHCA registry (combining ambulance, hospital and forensic data) in the state of Victoria, Australia (population 6.5 million). PARTICIPANTS: Victorians aged 1-50 years old experienced an OHCA between April 2019 and April 2020. MAIN OUTCOME MEASURES: Rates and underlying causes of OHCA in young rural and metropolitan Victorians. RESULTS: Rates of young OHCA were higher in rural areas (OHCA 22.5 per 100 000 rural residents vs. 13.4 per 100 000 metropolitan residents, standardised incidence ratio 168 (95% CI 101-235); confirmed cardiac cause of arrest 12.1 per 100 000 rural residents versus 7.5 per 100 000 metropolitan residents, standardised incidence ratio 161 (95% CI 71-251). The underlying causation of the OHCA and cardiovascular risk factor burden did

not differ between rural and metropolitan areas. CONCLUSION: Higher rates of OHCA occur in young rural patients, with standardised incidence ratio of 168 compared to young metropolitan residents. Rural status did not influence causes of cardiac arrest or known cardiovascular risk factor burden in young patients experiencing OHCA.

2. J Clin Med. 2022 Sep 26;11(19):5663. doi: 10.3390/jcm11195663.
Multimodality Imaging of Sudden Cardiac Death and Acute Complications in Acute Coronary Syndrome.
Muscogiuri G(1)(2), Guaricci AI(3), Soldato N(3), Cau R(4), Saba L(4), Siena P(3), Tarsitano MG(5), Giannetta E(6), Sala D(7), Sganzerla P(7), Gatti M(8), Faletti R(8), Senatieri A(2), Chierchia G(2), Pontone G(9), Marra P(2)(10), Rabbat MG(11)(12), Sironi S(2)(10).
ABSTRACT
Sudden cardiac death (SCD) is a potentially fatal event usually caused by a cardiac arrhythmia, which is often the result of coronary artery disease (CAD). Up to 80% of patients suffering from SCD have concomitant CAD. Arrhythmic complications may occur in patients with acute coronary syndrome (ACS) before admission, during revascularization procedures, and in hospital intensive care monitoring. In addition, about 20% of patients who survive cardiac arrest develop a transmural myocardial infarction (MI). Prevention of ACS can be evaluated in selected patients using cardiac computed tomography angiography (CCTA), while diagnosis can be depicted using electro-cardiography (ECG), and complications can be evaluated with cardiac magnetic resonance (CMR) and echocardiography. CCTA can evaluate plaque, burden of disease, stenosis, and adverse plaque characteristics, in patients with chest pain. ECG and echocardiography are the first-line tests for ACS and are affordable and useful for diagnosis. CMR can evaluate function and the presence of complications after ACS, such as development of ventricular thrombus and presence of myocardial tissue characterization abnormalities that can be the substrate of ventricular arrhythmias.

3. Sci Rep. 2022 Oct 6;12(1):16771. doi: 10.1038/s41598-022-20250-3.
Sudden cardiac death after alcohol intake: classification and autopsy findings.
Holmström L(1), Kauppila J(2), Vähätalo J(2), Pakanen L(3)(4), Perkiömäki J(2), Huikuri H(2), Junttila J(2).
ABSTRACT
Alcohol is known to have an immediate effect on cardiac rhythm, and previous studies have found that a notable proportion of sudden cardiac deaths (SCD) occur after alcohol intake. The objective of the present study was to investigate the association between the timing of alcohol intake and SCD. Our study population is drawn from the Fingesture study, which includes 5869 consecutive SCD cases from Northern Finland who underwent medicolegal autopsy 1998-2017. Toxicological analysis was performed if there was any suspicion of toxic exposure, or if there was no obvious immediate cause of SCD at autopsy. We found that 1563 (27%) of all SCD victims had alcohol in blood or urine at autopsy (mean age (61 ± 10 years, 88% male). Eighty-six percent of alcohol-related SCD victims had higher urine alcohol concentration than blood alcohol concentration, referring to the late-stage inebriation. These results suggest that the majority of alcohol-related SCDs occur at the late stage of inebriation.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

1. Clin Exp Emerg Med. 2022 Oct 14. doi: 10.15441/ceem.22.371. Online ahead of print.
Effect of corticosteroid administration on cardiac arrest: a systematic review and network meta-analysis of the timing of administration.
Pyo Y(1), Chung TN(1).

ABSTRACT
Corticosteroids may have a beneficial effect on the outcome of cardiac arrest (CA); however, it is not known whether the timing of corticosteroid use affects the outcome. We performed a systematic review and network meta-analysis to compare the efficacy of corticosteroid administration according to the timing. A favorable final outcome, as the primary study outcome, was defined as a combination of survival with good neurologic outcome and survival for 1 year. The secondary outcome was survival to discharge. Nine clinical studies were enrolled. Corticosteroids administered during cardiopulmonary resuscitation (CPR; odds ratio [OR], 1.29; 95% confidence interval [CI], 1.11-1.51) and post-CA (OR, 1.47; 95% CI, 1.30-1.66) had a positive effect on the favorable final outcome compared to the control protocol (no corticosteroid administration), while those used prior to CA had a negative effect. Corticosteroids administered post-CA had a positive effect on survival to discharge compared to the control protocol (OR, 1.82; 95% CI, 1.02-3.27), while those used prior to CA and during CPR had no significant effect. Post-CA was evaluated to be the best administration timing for both outcomes. In conclusion, the timing of corticosteroid administration may be an important factor for the prognosis of CA. Corticosteroids administration post-CA and during CPR may have beneficial effects on CA outcomes.

2. Resusc Plus. 2022 Oct 8;12:100315. doi: 10.1016/j.resplu.2022.100315. eCollection 2022 Dec.
Calcium use during cardiac arrest: A systematic review.
Messias Hirano Padrao E(1), Bustos B(1), Mahesh A(1), de Almeida Castro M(2), Randhawa R(1), John Dipollina C(1), Cardoso R(3), Grover P(4), Adler Maccagnan Pinheiro Besen B(5)(6).

ABSTRACT
INTRODUCTION: Calcium use during cardiac arrest has conflicting results in terms of efficacy. Therefore, we performed a systematic review evaluating the role of calcium administration in cardiac arrest. METHODS: We searched PubMed, Cochrane, and EMBASE for studies comparing calcium administration versus no calcium administration during cardiac arrest. The study was prospectively registered in PROSPERO (CRD42022316641) adhering to PRISMA guideline recommendations. The primary outcome was return of spontaneous circulation (ROSC) or survival at one hour. The secondary outcomes included survival to discharge or at 30 days, and favorable neurologic outcomes at 30 and 90 days. We planned to perform a random-effects meta-analysis of low risk of bias studies. We evaluated risk of bias with RoB-2 and ROBINS-I. RESULTS: We identified 1,921 articles and included ten studies with 2509 patients. We were not able to perform a meta-analysis with low-risk of bias studies as only one study was found to be at low-risk of bias. However, for the primary outcome, the three RCTs included showed no benefit with calcium administration

during cardiac arrest for ROSC. For the secondary outcomes, based on the most recent study and lower risk of bias, there was a neutral effect for survival to discharge or at 30 days and neurologic outcomes at 30 days. However, there was unfavorable neurologic outcomes at 90 days. CONCLUSION: Based on our results, calcium administration in cardiac arrests shows no benefit and can cause harm. Further studies on this matter are likely not advisable.

TRAUMA

1. Injury. 2022 Sep 30:S0020-1383(22)00725-2. doi: 10.1016/j.injury.2022.09.059. Online ahead of print.

Pre-hospital CPR after traumatic arrest: Outcomes at a level 1 pediatric trauma center.

Stewart S(1), Briggs KB(2), Fraser JA(2), Svetanoff WJ(2), Waddell V(2), Oyetunji TA(3).

ABSTRACT

BACKGROUND: The survival of traumatic cardiopulmonary arrest (TCA) requiring pre-hospital cardiopulmonary resuscitation (P-CPR) is abysmal across age groups. We aim to describe the mechanisms of injury and outcomes of children suffering from TCA leading to P-CPR at our institution. METHODS: A retrospective review was conducted to identify children ages 0-17 years who suffered TCA leading to P-CPR at our institution between 5/2009 and 3/2020. For analysis, patients were stratified into those still undergoing CPR at arrival and those who attained pre-hospital return of spontaneous circulation (ROSC). Primary outcome was discharge alive from the hospital. RESULTS: P-CPR was initiated for 48 patients who had TCA; 23 had pre-hospital ROSC. Of the 25 children undergoing CPR at presentation, none survived to discharge. The median duration of CPR, from initiation to time of death declaration was 34 min [29,50]. Seventeen patients died after resuscitation attempts in the ED, while 8 died after admission to the PICU. Of the 23 patients who attained pre-hospital ROSC, 6 survived to discharge. All survivors required intensive rehabilitation services at discharge and at most recent follow-up, 5 had residual deficits requiring medical attention. CONCLUSION: There are poor outcomes in children with pre-hospital traumatic cardiopulmonary arrest, particularly in those without pre-hospital ROSC. These data further support the need for standardized guidelines for resuscitation in children with traumatic cardiopulmonary arrest.

2. Emerg Med Australas. 2022 Oct 11. doi: 10.1111/1742-6723.14096. Online ahead of print.

Outcomes in traumatic cardiac arrest patients who underwent advanced life support.

Williamson F(1), Lawton CF(1), Wullschleger M(1).

ABSTRACT

OBJECTIVE: Survival following a traumatic cardiac arrest (TCA) remains poor despite research focused on specific management and guideline adaptation. Previous research has identified factors including age, arresting rhythm, injury severity and distance from hospital to be associated with prehospital TCA outcomes. The present study aimed to review the local incidence of TCA to inform local practice within a mature trauma system. METHODS: A retrospective trauma database review from 2008 to 2021 was conducted at the Royal Brisbane and Women's Hospital. Patients were categorised by prehospital and in-hospital arrest, prehospital return of spontaneous circulation (ROSC), and year in relation to TCA management protocol changes. Descriptive comparative analysis was performed with the primary outcome of interest being survival to hospital discharge. RESULTS: Survival to hospital discharge was similar in patients in whom TCA occurred in the prehospital environment and hospital (24 vs 29%). Mechanism of injury, response to intervention and location of cardiac arrest were important outcome associations. Patients with a positive focused assessment with sonography in trauma scan were less likely to achieve ROSC but more likely to survive to

discharge. The frequency of prehospital interventions remained similar after the guideline changes; with more patients arriving to the hospital with improved haemodynamic parameters and increased survival. CONCLUSIONS: These results support the identification and immediate management of TCA. No patients survived if they did not achieve ROSC by hospital arrival, questioning the role for aggressive management beyond the ED in this cohort. Future research will focus on the identification of patients with potentially positive survival outcomes and further define futile intervention factors.

VENTILATION

No articles identified.

CERERBRAL MONITORING

1. Am J Emerg Med. 2022 Oct 7:S0735-6757(22)00633-7. doi: 10.1016/j.ajem.2022.10.003. Online ahead of print.

Cautions for hypernatremia interpretation regarding long-term neurological outcomes in out-of-hospital cardiac arrest survivors.

Jouffroy R(1), Vivien B(2).

NO ABSTRACT AVAILABLE

2. Rev Esp Cardiol (Engl Ed). 2022 Oct 10:S1885-5857(22)00248-1. doi: 10.1016/j.rec.2022.09.011. Online ahead of print.

Association between in-hospital glycemic control and neurological outcome at 6 months of follow-up in survivors of out-of-hospital cardiac arrest. [Article in English, Spanish]

Valerio-Rojas JC(1), Izquierdo M(2), Diego O(3), Ortega E(4), Conget I(4), Andrea R(5).

NO ABSTRACT AVAILABLE

3. Neurology. 2022 Sep 13;99(11):e1113-e1121. doi: 10.1212/WNL.0000000000200854. Epub 2022 Jul 5.

Bayesian Outcome Prediction After Resuscitation From Cardiac Arrest.

Elmer J(1), Coppler PJ(2), Jones BL(2), Nagin DS(2), Callaway CW(2); University of Pittsburgh Post-Cardiac Arrest Service.

ABSTRACT

BACKGROUND AND OBJECTIVES: Postarrest prognostication research does not typically account for the sequential nature of real-life data acquisition and interpretation and reports nonintuitive estimates of uncertainty. Bayesian approaches offer advantages well suited to prognostication. We used Bayesian regression to explore the usefulness of sequential prognostic indicators in the context of prior knowledge and compared this with a guideline-concordant algorithm. METHODS: We included patients hospitalized at a single center after cardiac arrest. We extracted prospective data and assumed these data accrued over time as in routine practice. We considered predictors demographic and arrest characteristics, initial and daily neurologic examination, laboratory results, therapeutic interventions, brain imaging, and EEG. We fit Bayesian hierarchical generalized linear multivariate models predicting discharge Cerebral Performance Category (CPC) 4 or 5 (poor outcomes) vs 1-3 including sequential clinical and prognostic data. We explored outcome posterior probability distributions (PPDs) for individual patients and overall. As a comparator, we applied the 2021 European Resuscitation Council and European Society of Intensive Care Medicine (ERC/ESICM) guidelines. RESULTS: We included 2,692 patients of whom 864 (35%) were discharged with a CPC 1-

3. Patients' outcome PPDs became narrow and shifted toward 0 or 1 as sequentially acquired information was added to models. These changes were largest after arrest characteristics and initial neurologic examination were included. Using information typically available at or before intensive care unit admission, sensitivity predicting poor outcome was 51% with a 0.6% false-positive rate. In our most comprehensive model, sensitivity for poor outcome prediction was 76% with 0.6% false-positive rate (FPR). The ERC/ESICM algorithm applied to 547 of 2,692 patients and yielded 36% sensitivity with 0% FPR. DISCUSSION: Bayesian models offer advantages well suited to prognostication research. On balance, our findings support the view that in expert hands, accurate neurologic prognostication is possible in many cases before 72 hours postarrest. Although we caution against early withdrawal of life-sustaining therapies, rapid outcome prediction can inform clinical decision making and future clinical trials.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Resusc Plus. 2022 Oct 6;12:100312. doi: 10.1016/j.resplu.2022.100312. eCollection 2022 Dec.
Increasing lay-people's intentions to initiate CPR in out of hospital cardiac arrest: Results of a mixed-methods 'before and after' pilot study of a behavioural text-message intervention (BICeP).
Farquharson B(1), Calveley E(2), Clegg G(3), Williams B(2), Ramsay P(4), Macinnes L(3), Torrens C(5), Dixon D(6).

ABSTRACT
BACKGROUND: Prompt, effective cardio-pulmonary resuscitation (CPR) increases survival in out-of-hospital cardiac arrest. However, CPR is often not provided, even by people with training. Low confidence, perceptions of risks and high emotion can prevent initiation of CPR. Behaviour-change techniques may be helpful in increasing CPR rates. AIM: To pilot a text-message behavioural intervention designed to increase intentions to initiate CPR, explore participant responses and pilot methods for future randomised controlled trial of effectiveness. METHODS: A 'before and after' pilot study plus qualitative interviews was undertaken. Participants were lay-people who had undertaken CPR training in previous 2 years.Participants were sent an intervention, comprising 35 text-messages containing 14 behaviour-change techniques, to their mobile phone over 4-6 weeks.Primary outcome: intentions to initiate CPR assessed in response to 4 different scenarios.Secondary outcomes: theory-based determinants of intention (attitudes, subjective norms, perceived behavioural control and self-efficacy) and self-rated competence. RESULTS: 20 participants (6 female, 14 male), aged 20-84 provided baseline data. 17 received the full suite of 35 text messages.15 provided follow-up data. Intentions to perform CPR in scenarios where CPR was indicated were high at baseline and increased (18.1 ± 3.2-19.5 ± 1.8/21) after the intervention, as did self-efficacy and self-rated competency. Self-efficacy, attitudes, perceived behavioural control and subjective norms were positively correlated with intentions. Qualitative data suggest the intervention was perceived as useful. Additional options for delivery format and pace were suggested. CONCLUSIONS: Pilot-testing suggests a text-message intervention delivered after CPR training is acceptable and may be helpful in increasing/maintaining intentions to perform CPR.

2. J Clin Med. 2022 Sep 27;11(19):5707. doi: 10.3390/jcm11195707.

Impact of Cardiopulmonary Resuscitation on Emergency Medical Staff-Romanian Perspective (IRESUS-EMS).

Nedelea PL(1), Corlade-Andrei M(1)(2), Kantor C(2), Popa OT(1)(2), Manolescu E(1)(2), Cimpoeșu D(1)(2).

ABSTRACT

BACKGROUND: Unnecessary resuscitation is defined as putting in a disproportionate amount of effort compared to the patients' prognosis and chance of survival. The primary objective of this study was to determine the number of resuscitations perceived as unnecessary by emergency medical personnel and to correlate it with the characteristics of resuscitation team members, patient particularities and organizational factors related to the professional environment. METHODS: This was a prospective cross-sectional study carried out in the emergency department of a university hospital, exploring the perception of the uselessness of cardiopulmonary resuscitation (CPR) through the completion of a questionnaire. RESULTS: In total, 70.37% of respondents are often involved in CPR attempts in which the efforts made are disproportionate compared to the patients' expected prognosis, in terms of survival or quality of life. The presence of a non-shockable rhythm increased, by two times, the chances of medical staff finding it unnecessary to initiate CPR. CONCLUSIONS: The current study was the first in Romania to investigate the perception of unnecessary CPR, based on the recollection of the last resuscitation performed by the emergency medical staff. The objective criteria related to the patient were the most important predictors for assessing the adequacy of the decision to initiate CPR.

3. Resuscitation. 2022 Oct 6:S0300-9572(22)00679-7. doi: 10.1016/j.resuscitation.2022.09.021. Online ahead of print.

Enhancing Cardiopulmonary Resuscitation Education Through Game-Based Augmented Reality Face Filters.

Fijačko N(1), Masterson Creber R(2), Chang TP(3), Krsteski K(4), Greif R(5).

NO ABSTRACT AVAILABLE

4. Acad Pediatr. 2022 Oct 8:S1876-2859(22)00524-1. doi: 10.1016/j.acap.2022.09.023. Online ahead of print.

Assessing Effective Practices and Barriers to Creating School and Community Partnerships for a Sudden Cardiac Death Prevention Program: A National Project ADAM® study: Project ADAM Affiliate Site Survey.

Malloy-Walton L(1), Gopineti L(2), Thompson AJ(3), Vetter VL(4), Batlivala SP(5).

ABSTRACT

OBJECTIVES: Project ADAM® (Automated Defibrillators in Adam's Memory) is a national collaborative to improve outcomes for out-of-hospital sudden cardiac arrest. Given Project ADAM's expansion, we sought to identify effective methods to partner with community leaders and understand barriers to engagement. Our aim was to establish effective practices to guide affiliates and optimize site operations and partnerships. METHODS: We conducted a survey of all Project ADAM sites in 2020. Medical Directors and Program Coordinators were included for generalizability. The survey consisted of 20 questions covering the domains of communication, goals for partner organizations, partnership barriers, staff time commitments, and Project ADAM program needs. RESULTS: Thirty-one members responded: 14 Medical Directors and 17 Program Coordinators. E-mail was the predominant method to initiate (58%) and maintain (87%) contact with partner organizations, though telephone (21%) and in-person visits (14%) were common for initiating contact. Presentations at school board, Emergency Medical Services, and athletic director meetings and student/family testimonials were powerful engagement tools. Barriers to partnership varied, revolving around limited school budgets,

overburdened staff, and Covid-19. Limited time, difficulty coordinating schedules, and lack of dedicated resources were common challenges for Project ADAM sites. Only 36% of Medical Directors receive institutional recognition of Project ADAM effort. CONCLUSIONS: Project ADAM's partnership with community stakeholders creates unique opportunities and challenges. Optimal communication methods should be identified early for each school, with regular interaction for long-term success. Institutional recognition of Project ADAM efforts may boost success. Additionally, the Covid-19 pandemic created numerous challenges and may spur operational changes.

5. J Urban Health. 2022 Oct 10. doi: 10.1007/s11524-022-00691-x. Online ahead of print.
Survival After Out-of-Hospital Cardiac Arrest: The Role of Racial Residential Segregation.
Abbott EE(1), Buckler DG(2), Hsu JY(3), Jacoby SF(4), Abella BS(5), Richardson LD(2)(6)(7), Carr BG(2)(6), Zebrowski AM(2)(6).
ABSTRACT
Racial and racialized economic residential segregation has been empirically associated with outcomes across multiple health conditions but not yet explored in relation to out-of-hospital cardiac arrest (OHCA). We sought to examine if measures of racial and economic residential segregation are associated with differences in survival to discharge after OHCA for Black and White Medicare beneficiaries. Utilizing age-eligible Medicare fee-for-service claims data from 2013 to 2015, we identified OHCA claims and determined survival to discharge. The primary predictor, residential segregation, was calculated using the index of concentration at the extremes (ICE) for the beneficiary residential ZIP code. Multilevel modified Poisson regression models were used to determine the association of OHCA outcomes and ZIP code level ICE measures. In total, 194,263 OHCA cases were identified among beneficiaries residing in 75% of US ZIP codes. Black beneficiaries exhibited 12.1% survival to discharge, compared with 12.5% of White beneficiaries. In fully adjusted models of the three ICE measures accounting for differences in treating hospital characteristics, there was as high as a 28% (RR 1.28, CI 1.23-1.26) higher relative likelihood of survival to discharge in the most segregated White ZIP codes (Q5) as compared to the most segregated Black ZIP codes (Q1). Racial residential segregation is independently associated with disparities in OHCA outcomes; among Medicare beneficiaries who generated a claim after suffering an OHCA, ICE measures of racial segregation are associated with a lower likelihood of survival to discharge for those living in the most segregated Black and lower income quintiles compared to higher quintiles.

6. Clin Exp Emerg Med. 2022 Oct 7. doi: 10.15441/ceem.22.205. Online ahead of print.
The number and level of first-contact emergency medical services crew and clinical outcomes in out-of-hospital cardiac arrest with dual dispatch response.
Kim YS(1), Kim KH(2)(3), Song KJ(3)(4), Shin SD(2)(3), Park JH(2)(3).
ABSTRACT
OBJECTIVE: This study aimed to evaluate the association between the number and level of emergency medical technicians (EMTs) in the first-contact emergency medical services (EMS) unit and the clinical outcomes of out-of-hospital cardiac arrest (OHCA) with a dual dispatch response. METHODS: Adult nontraumatic EMS-treated OHCAs between 2015 and 2018 in a nationwide database, were enrolled. The main exposure was the number and certification level of first-contact EMS crew: three versus two members, proportion of EMT intermediate level (EMT-I) over 50% versus under or equal to 50%. Good neurologic recovery was selected as the primary outcome. Multilevel multivariable logistic regression analysis was conducted to calculate adjusted odds ratios and confidence intervals. RESULTS: A total of 26,867 patients were enrolled and analyzed. Good neurologic recovery was different across the study groups: 5.4% in the two-member crews, 7.2% in the three-member crews, 5.9% in the low EMT-I proportion crews, and 6.8% in the high EMT-I

proportion crews. In the main analysis, statistically significant differences for favorable outcomes were found between the three-member and two-member crews, and the high EMT-I proportion and low EMT-I proportion crews; for good neurologic recovery, adjusted odds ratios (95% confidence interval) were 1.23 (1.06-1.43) for three-member crews, and 1.28 (1.17-1.40) for a high EMT-I proportion. CONCLUSION: The higher number and level of first-contact EMS crew was associated with better neurologic recovery in adult nontraumatic OHCA with a dual-dispatched EMS response.

7. Can J Cardiol. 2022 Sep 19:S0828-282X(22)00861-3. doi: 10.1016/j.cjca.2022.09.012. Online ahead of print.
Linking Data Through the Chain of Survival: The Potential for Better Population-Based Out-of-Hospital Cardiac Arrest Epidemiology, Process of Care, Risk Prediction, and Outcomes.
van Diepen S(1), Jentzer JC(2).
NO ABSTRACT AVAILABLE

8. Australas Emerg Care. 2022 Oct 11:S2588-994X(22)00084-7. doi: 10.1016/j.auec.2022.10.001. Online ahead of print.
Effect of a specific training intervention with task interruptions on the quality of simulated advance life support: A randomized multi centered controlled simulation study.
Truchot J(1), Michelet D(2), Philippon AL(3), Drummond D(4), Freund Y(3), Plaisance P(5).
ABSTRACT
PURPOSE: Task interruptions (TI) are frequent disturbances for emergency professionals performing advanced life support (ALS). The aim of our study was to evaluate a specific training intervention with TI on the quality of simulated ALS. METHODS: During this multi centered randomized controlled trial, each team included one resident, one nurse and one emergency physician. The teams were randomized for the nature of their training session: control (without interruption) or intervention (with TI). The primary outcome was non-technical skills assessed with the TEAM score. We also measured the no flow time, the Cardiff score and chest compression depth and rate. RESULTS: On a total of 21 included teams, 11 were randomized to a control training session and 10 to the specific TI training. During training, teams' characteristics and skills were similar between the two groups. During the evaluation session, the TEAM score was not different between groups: median score for control group 33,5 vs 31,5 for intervention group. We also report similar no flow time and Cardiff score. CONCLUSION: In this simulated ALS study, a specific training intervention with TI did not improve technical and non-technical skills. Further research is required to limit the impact of TI in emergency settings.

9. JMIR Med Inform. 2022 Oct 13;10(10):e42429. doi: 10.2196/42429.
Fast Healthcare Interoperability Resources for Inpatient Deterioration Detection With Time-Series Vital Signs: Design and Implementation Study.
Tseng TW(#)(1), Su CF(#)(2), Lai F(#)(1).
ABSTRACT
BACKGROUND: Vital signs have been widely adopted in in-hospital cardiac arrest (IHCA) assessment, which plays an important role in inpatient deterioration detection. As the number of early warning systems and artificial intelligence applications increases, health care information exchange and interoperability are becoming more complex and difficult. Although Health Level 7 Fast Healthcare Interoperability Resources (FHIR) have already developed a vital signs profile, it is not sufficient to support IHCA applications or machine learning-based models. OBJECTIVE: In this paper, for IHCA instances with vital signs, we define a new implementation guide that includes data mapping, a system architecture, a workflow, and FHIR applications. METHODS: We interviewed 10 experts

regarding health care system integration and defined an implementation guide. We then developed the FHIR Extract Transform Load to map data to FHIR resources. We also integrated an early warning system and machine learning pipeline. RESULTS: The study data set includes electronic health records of adult inpatients who visited the En-Chu-Kong hospital. Medical staff regularly measured these vital signs at least 2 to 3 times per day during the day, night, and early morning. We used pseudonymization to protect patient privacy. Then, we converted the vital signs to FHIR observations in the JSON format using the FHIR Extract Transform Load application. The measured vital signs include systolic blood pressure, diastolic blood pressure, heart rate, respiratory rate, and body temperature. According to clinical requirements, we also extracted the electronic health record information to the FHIR server. Finally, we integrated an early warning system and machine learning pipeline using the FHIR RESTful application programming interface. CONCLUSIONS: We successfully demonstrated a process that standardizes health care information for inpatient deterioration detection using vital signs. Based on the FHIR definition, we also provided an implementation guide that includes data mapping, an integration process, and IHCA assessment using vital signs. We also proposed a clarifying system architecture and possible workflows. Based on FHIR, we integrated the 3 different systems in 1 dashboard system, which can effectively solve the complexity of the system in the medical staff workflow.

POST-CARDIAC ARREST TREATMENTS

1. PLoS One. 2022 Oct 14;17(10):e0276011. doi: 10.1371/journal.pone.0276011. eCollection 2022.
Post-intensive care syndrome in out-of-hospital cardiac arrest patients: A prospective observational cohort study.
Vincent A(1)(2), Beck K(1), Thommen E(1), Widmer M(1), Becker C(1)(3), Loretz N(1), Gross S(1)(2), Mueller J(1), Amacher SA(1)(4), Bohren C(1), Schaefert R(1)(5), Gaab J(2), Marsch S(4)(5), Emsden C(4), Tisljar K(4), Sutter R(4)(5), Hunziker S(1)(5).

ABSTRACT
INTRODUCTION: Intensive care unit patients are at risk for post-intensive care syndrome (PICS), which includes psychological, physical and/or cognitive sequelae after their hospital stay. Our aim was to investigate PICS in adult patients with out-of-hospital cardiac arrest (OHCA). METHODS: In this prospective observational cohort study, we assessed risks for PICS at 3 and 12-month follow-up within the following domains: a) physical impairment (EuroQol [EQ-5D-3L]), b) cognitive functioning (Cerebral Performance Category [CPC] score >1, modified Rankin Scale [mRS] >2) and c) psychological burden (Hospital Anxiety and Depression Scale [HADS], Impact of Event Scale-Revised [IES-R]). RESULTS: At 3 months, 69/139 patients (50%) met the definition of PICS including 37% in the physical domain, 25% in the cognitive domain and 13% in the psychological domain. Intubation (OR 2.3, 95%CI 1.1 to 5,0 p = 0.03), sedatives (OR 3.4, 95%CI 1 to 11, p = 0.045), mRS at discharge (OR 4.3, 95%CI 1.70 to 11.01, p = 0.002), CPC at discharge (OR 3.3, 95%CI 1.4 to 7.6, p = 0.005) and post-discharge work loss (OR 13.4, 95%CI 1.7 to 107.5, p = 0.014) were significantly associated with PICS. At 12 months, 52/110 (47%) patients had PICS, which was associated with prolonged duration of rehabilitation, higher APACHE scores, and higher mRS and CPC scores at hospital discharge. CONCLUSIONS: Nearly half of long-term OHCA survivors show PICS after 3 and 12 months. These high numbers call for more emphasis on appropriate screening and treatment in this patient population. Future studies should evaluate whether early identification of these patients enables preventive strategies and treatment options.

2. J Cardiovasc Med (Hagerstown). 2022 Oct 10. doi: 10.2459/JCM.0000000000001380. Online ahead of print.
Immediate coronary angiography in patients with out-of-hospital cardiac arrest without ST-segment elevation: a meta-analysis of randomized trials.

Kiyohara Y(1), Matsumoto S(2), Takagi H(3), Kuno T(4).
NO ABSTRACT AVAILABLE

TARGETED TEMPERATURE MANAGEMENT

1. J Chin Med Assoc. 2022 Oct 1;85(10):987-992. doi: 10.1097/JCMA.0000000000000767. Epub 2022 Jun 21.

Prognostic significance of the blood urea nitrogen to creatinine ratio in in-hospital cardiac arrest after targeted temperature management.

Meng YH(1), Lin PY(1), Wu YH(2), Hou PC(3), How CK(1)(4)(5), Chen CT(1)(4)(6).

ABSTRACT

BACKGROUND: Targeted temperature management (TTM) has been reported to improve outcomes in in-hospital cardiac arrest (IHCA) patients but little has been investigated into the relationship between prognoses and the blood urea nitrogen to creatinine ratio (BCR). METHODS: A retrospective analysis of data from IHCA survivors treated with TTM between 2011 and 2018 was conducted based on the Research Patient Database Registry of the Partners HealthCare system in Boston. Serum laboratory data were measured during IHCA and within 24 hours after TTM completion. Intra-arrest and post-TTM BCRs were calculated, respectively. The primary outcome was neurologic status at discharge. The secondary outcome was in-hospital mortality. RESULTS: The study included 84 patients; 63 (75%) were discharged with a poor neurologic status and 40 (47.6%) died. Regarding poor neurological outcome at discharge, multivariate analysis revealed that post-TTM BCR was a significant predictor (adjusted OR, 1.081; 95% CI, 1.002-1.165; p = 0.043) and intra-arrest BCR was a marginal predictor (adjusted OR, 1.067; 95% CI, 1.000-1.138; p = 0.050). Post-TTM BCR had an acceptably predictive ability to discriminate neurological status at discharge, with an area under the receiver-operating characteristic curve of 0.644 (95% CI, 0.516-0.773) and a post-TTM BCR cutoff value of 16.7 had a sensitivity of 61.9% and a specificity of 70.0%. CONCLUSION: Post-TTM BCR was a significant predictor of the neurologic outcome at discharge among IHCA patients receiving TTM. IHCA patients with elevated intra-arrest BCR also had a borderline poor neurological prognosis at discharge.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. Resusc Plus. 2022 Oct 6;12:100310. doi: 10.1016/j.resplu.2022.100310. eCollection 2022 Dec.

Protocol for a cluster randomised controlled feasibility study of Prehospital Optimal Shock Energy for Defibrillation (POSED).

Pocock H(1)(2), Deakin CD(2)(3), Lall R(1), Michelet F(1), Contreras A(1), Ainsworth-Smith M(2), King P(2), Devrell A(4), Smith DE(4), Perkins GD(1)(5).

ABSTRACT

AIMS: The Prehospital Optimal Shock Energy for Defibrillation (POSED) study will assess the feasibility of conducting a cluster randomised controlled study of clinical effectiveness in UK ambulance services to identify the optimal shock energy for defibrillation. METHODS: POSED is a pragmatic, allocation concealed, open label, cluster randomised, controlled feasibility study. Defibrillators within a single UK ambulance service will be randomised in an equal ratio to deliver one of three shock strategies 120-150-200 J, 150-200-200 J, 200-200-200 J. Consecutive adults (≥18 years) presenting with out of hospital cardiac arrest requiring defibrillation will be eligible. The study plans to enrol 90 patients (30 in each group). Patients (or their relatives for non-survivors) will be informed about trial participation after the initial emergency has resolved. Survivors will be

invited to consent to participate in follow-up (i.e., at 30 days or discharge).The primary feasibility outcome is the proportion of eligible patients who receive the randomised study intervention. Secondary feasibility outcomes will include recruitment rate, adherence to allocated treatment and data completeness. Clinical outcomes will include Return of an Organised Rhythm (ROOR) at 2 minutes post-shock, refibrillation rate, Return of Spontaneous Circulation (ROSC) at hospital handover, survival and neurological outcome at 30 days. CONCLUSION: The POSED study will assess the feasibility of a large-scale trial and explore opportunities to optimise the trial protocol.

PEDIATRICS AND CHILDREN

1. Thromb J. 2022 Oct 11;20(1):62. doi: 10.1186/s12959-022-00422-x.

Early coagulopathy after pediatric out-of-hospital cardiac arrest: secondary analysis of a randomized clinical trial.

Zhou D(#)(1), Li T(#)(2), Lv Y(1), Wang D(1), Zhang R(1), Lin Q(1), Wang C(1), Zhao D(1), Fei S(1), He W(1).

ABSTRACT

BACKGROUND: To estimate the incidence, risk factors, and impact on mortality and functional outcomes for early coagulopathy after the return of spontaneous circulation (ROSC) in pediatric out-of-hospital cardiac arrest (OHCA) patients. METHODS: A post hoc analysis of the Therapeutic Hypothermia after Pediatric Cardiac Arrest Out-of-Hospital (THAPCA-OH) trial was conducted. Early coagulopathy was defined as presence of at least one of the following coagulation abnormalities upon admission: international standard ratio (INR), platelets, and age-adjusted activated partial thromboplastin time (APTT) within 6 h after OHCA and before therapeutic hypothermia initiation. The outcomes included 28-day mortality and functional prognosis. Multivariable logistic regression models were used to explore risk factors and association between early coagulopathy and outcomes. RESULTS: Of the 227 patients included, 152 (67%) were male and the median age was 2.3 years [interquartile range (IQR), 0.7-8.6 years]. The overall 28-day mortality was 63%. The incidence of early coagulopathy was 46%. Lower age, longer duration of chest compression, lower temperature, and higher white blood cell (WBC) upon admission increased the risk of early coagulopathy. Early coagulopathy [OR, 2.20 (95% CI, 1.12-4.39), P = 0.023] was independently associated with 28-day mortality after adjusting for confounders. CONCLUSIONS: Early coagulopathy occurred in almost half of pediatric patients with OHCA. Lower age, longer duration of chest compression, lower temperature, and higher WBC increased the risk. The development of early coagulopathy was independently associated with increased mortality.

EXTRACORPOREAL LIFE SUPPORT

1. J Emerg Med. 2022 Oct 12:S0736-4679(22)00447-4. doi: 10.1016/j.jemermed.2022.08.005. Online ahead of print.

Long-Term Neurological Outcome of Extracorporeal Cardiopulmonary Resuscitation for Out-of-Hospital Cardiac Arrest Patients With Nonshockable Rhythms: A Single-Center, Consecutive, Retrospective Observational Study.

Takahagi M(1), Sawano H(1), Moriyama T(1).

ABSTRACT

BACKGROUND: Data on extracorporeal cardiopulmonary resuscitation (ECPR) in patients with out-of-hospital cardiac arrest (OHCA) and initially nonshockable rhythms are limited. OBJECTIVE: This study aimed to evaluate the long-term neurological outcomes of ECPR for patients with OHCA and initially nonshockable rhythms. METHODS: In this single-center, consecutive, retrospective, observational

study, patients with OHCA and initially nonshockable rhythms who underwent ECPR between January 2012 and December 2017 were included. All patients with refractory cardiopulmonary arrest were transported while undergoing conventional CPR and received ECPR on arrival in the emergency department. We retrospectively collected characteristics at admission and neurological outcomes at the last visit or telephone interview. Cerebral performance category (CPC) scales 1 and 2 were defined as good neurological outcomes and CPC scales 3, 4, and 5 were defined as poor neurological outcomes. RESULTS: Of the 39 patients included in this study, 32 died in the hospital and only 7 survived. There were 4, 0, 0, 3, and 32 patients with CPC 1, 2, 3, 4, and 5, respectively. The proportion of good neurological outcomes for all patients was 10.3% (95% CI 2.9-24.2%) and 14.3% (95% CI 4.0-32.7%) for patients with pulseless electrical activity. No patients with asystole had a good neurological outcome. Median follow-up period was 1052 days (interquartile range 116-1589 days) for those who survived to discharge. CONCLUSIONS: Approximately 10% of initially nonshockable patients with OHCA, generally considered to be a poor prognosis, could acquire good neurological outcomes when they underwent ECPR with our indications.

2. Resuscitation. 2022 Oct 12:S0300-9572(22)00685-2. doi: 10.1016/j.resuscitation.2022.10.006. Online ahead of print.

Initial rhythm and survival in refractory out-of-hospital cardiac arrest. Post-hoc analysis of the Prague OHCA randomized trial.

Havranek S(1), Fingrova Z(2), Rob D(2), Smalcova J(2), Kavalkova P(2), Franek O(3), Smid O(2), Huptych M(4), Dusik M(2), Linhart A(2), Belohlavek J(2).

ABSTRACT

BACKGROUND: The prognosis of refractory out-of-hospital cardiac arrest (OHCA) is generally poor. A recent Prague-OHCA study has demonstrated that an invasive approach (including extracorporeal cardiopulmonary resuscitation, ECPR) is a feasible and effective treatment strategy in refractory OHCA. Here we present a post-hoc analysis of the role of initial rhythm on patient outcomes. METHODS: The study enrolled patients who had a witnessed OHCA of presumed cardiac cause without early recovery of spontaneous circulation. The initial rhythm was classified as either a shockable or a non-shockable rhythm. The primary outcome was a composite of 180 day-survival with Cerebral Performance in Category 1 or 2. RESULTS: 256 (median age 58y, 17% females) patients were enrolled. The median (IQR) duration of resuscitation was 52 (33-68) minutes. 156 (61%) and 100 (39%) of patients manifested a shockable and non-shockable rhythm, respectively. The primary outcome was achieved in 63 (40%) patients with a shockable rhythm and in 5 (5%) patients with a non-shockable rhythm ($p<0.001$). When patients were analyzed separately based on whether the treatment was invasive (n=124) or standard (n=132), the difference in the primary endpoint between shockable and non-shockable initial rhythms remained significant (35/72 (49%) vs. 4/52 (8%) in the invasive arm and 28/84 (33%) vs. 1/48 (2%) in the standard arm; $p<0.001$). CONCLUSION: An initial shockable rhythm and treatment with an invasive approach is associated with a reasonable neurologically favorable survival for 180 days despite refractory OHCA. Non-shockable initial rhythms bear a poor prognosis in refractory OHCA even when ECPR is readily available.

3. Front Cardiovasc Med. 2022 Sep 27;9:963002. doi: 10.3389/fcvm.2022.963002. eCollection 2022.

Effects and safety of extracorporeal membrane oxygenation in the treatment of patients with ST-segment elevation myocardial infarction and cardiogenic shock: A systematic review and meta-analysis.

Pang S(1), Miao G(1), Zhao X(1).

ABSTRACT

BACKGROUND: There is a lack of large randomized controlled trials (RCTs) that comprehensively evaluate the effects of venoarterial extracorporeal membrane oxygenation (V-A ECMO)- assisted treatment of patients with ST-segment elevation myocardial infarction (STEMI) combined with

Cardiogenic shock (CS). This meta-analysis aims to identify predictors of short-term mortality, and the incidence of various complications in patients with STEMI and CS treated with V-A ECMO. METHODS: We searched PubMed, Cochrane Library, Web of Science, Embase, China National Knowledge Infrastructure (CNKI), and the Wanfang Database from 2008 to January 2022 for studies evaluating patients with STEMI and CS treated with V-A ECMO. Studies that reported on mortality in ≥ 10 adult (>18 years) patients were included. Newcastle-Ottawa Scale was used by two independent reviewers to assess methodological quality. Mantel-Haenszel models were used to pool the data for meta-analysis. RESULTS: Sixteen studies (1,162 patients) were included with a pooled mortality estimate of 50.9%. Age > 65 years, BMI > 25 kg/m2, lactate > 8 mmol/L, anterior wall infarction, longer CPR time, and longer time from arrest to extracorporeal cardiopulmonary resuscitation (ECPR) were risk predictors of mortality. Achieving TIMI-3 flow after percutaneous coronary intervention (PCI) was a protective factor of mortality. The prevalence of bleeding, cerebral infarction, leg ischemia, and renal failure were 22, 9.9, 7.4, and 49.4%, respectively. CONCLUSION: Our study identified Age, BMI, lactate, anterior wall infarction, TIMI-3 flow after PCI, CPR time, and time from arrest to ECPR significantly influence mortality in STEMI patients with CS requiring V-A ECMO. These factors may help clinicians to detect patients with poor prognoses earlier and develop new mortality prediction models.

4. Eur Heart J Acute Cardiovasc Care. 2022 Oct 14:zuac135. doi: 10.1093/ehjacc/zuac135. Online ahead of print.
Extracorporeal Cardiopulmonary Resuscitation: A National Study on the Association Between Favorable Neurological Status and Biomarkers of Hypoperfusion, Inflammation, and Organ Injury.
Gregers E(1)(2), Mørk SR(3), Linde L(4), Andreasen JB(5), Smerup M(2)(6), Kjærgaard J(1), Møller-Sørensen PH(7), Holmvang L(1)(6), Christensen S(3)(8), Terkelsen CJ(3)(8)(9), Tang M(8)(10), Møller JE(1)(4)(11), Lassen JF(4)(11), Schmidt H(12), Riber LP(13), Winther-Jensen M(14), Thomassen S(5), Laugesen H(5), Hassager C(1)(6), Søholm H(1)(15).
ABSTRACT
BACKGROUND: In refractory out-of-hospital cardiac arrest (OHCA) with prolonged whole-body ischemia, global tissue injury proceeds even after establishment of circulation with extracorporeal cardiopulmonary resuscitation (ECPR). We aimed to investigate the role of biomarkers reflecting hypoperfusion, inflammation, and organ injury in prognostication of patients with refractory OHCA managed with ECPR. METHODS: This nationwide retrospective study included 226 adults with refractory OHCA managed with ECPR in Denmark (2011-2020). Biomarkers the first days after ECPR-initiation were assessed. Odds ratio of favorable neurological status (Cerebral Performance Category 1-2) at hospital discharge were estimated by logistic regression analyses. Cut-off values were calculated using the Youden's index. RESULTS: Fifty-six patients (25%) survived to hospital discharge, 51 (91%) with a favorable neurological status. Factors independently associated with favorable neurological status were low flow time <81 minutes, admission leukocytes ≥12.8 × 109/L, admission lactate <13.2 mmol/L, alkaline phosphatase (ALP) < 56 (day1) or <55 U/L (day2), and day 1 creatine kinase MB (CK-MB) < 500 ng/mL. Selected biomarkers (leukocytes, C-reactive protein, and lactate) were significantly better predictors of favorable neurological status than classic OHCA-variables (sex, age, low-flow time, witnessed arrest, shockable rhythm) alone (p = 0.001) after hospital admission. CONCLUSION: Biomarkers of hypoperfusion (lactate), inflammation (leukocytes), and organ injury (ALP and CK-MB) were independently associated with neurological status at hospital discharge. Biomarkers of hypoperfusion and inflammation (at hospital admission) and organ injury (days 1 and 2 after ECPR) may aid in the clinical decision of when to prolong or terminate ECPR in cases of refractory OHCA.

5. Emerg Med Australas. 2022 Oct 10. doi: 10.1111/1742-6723.14100. Online ahead of print.
Role of the emergency department in implementing an extracorporeal membrane oxygenation cardiopulmonary resuscitation.

Gilbert F(1)(2), Mitchell G(1)(2)(3), Townsend S(2)(4), Dhanani J(4)(5)(6), Sng N(1)(2).
ABSTRACT
The Royal Brisbane and Women's Hospital has introduced an extracorporeal membrane oxygenation (ECMO) cardiopulmonary resuscitation (E-CPR) service with collaboration between ED and ICU teams for refractory cardiac arrest patients. E-CPR is potentially beneficial to patients who do not gain return of spontaneous circulation after conventional advanced cardiac life support treatments, provided specific demographic and biochemical inclusion criteria are met. A joint ICU and ED decision is reached to commence ECMO flow. We discuss our rationale to use the ED and the emergency physician role in leading the multidisciplinary team, with ICU leading the cannulation team. The development of ED processes and the increased availability of this intervention can significantly impact the survivability of refractory cardiac arrest with good neurological outcomes.

6. J Emerg Med. 2022 Oct 10:S0736-4679(22)00352-3. doi: 10.1016/j.jemermed.2022.06.011. Online ahead of print.
Extracorporeal Membrane Oxygenation in the Emergency Department for Out-of-Hospital Cardiac Arrest.
Meurer WJ(1), Kaplan A(2).
NO ABSTRACT AVAILABLE

7. Med Klin Intensivmed Notfmed. 2022 Oct;117(7):500-509. doi: 10.1007/s00063-021-00796-2. Epub 2021 Apr 9.
[Extracorporeal cardiopulmonary resuscitation (eCPR)].
[Article in German; Abstract available in German from the publisher]
Pilarczyk K(1), Michels G(2), Wolfrum S(3), Trummer G(4), Haake N(5).
ABSTRACT
Extracorporeal cardiopulmonary resuscitation (eCPR) is the implementation of extracorporeal membrane oxygenation (ECMO) in selected patients with cardiac arrest and may be considered when conventional CPR efforts fail, as written in the latest international guidelines. eCPR is a complex intervention that requires a highly trained team, specialized equipment, and multidisciplinary support within a healthcare system and it has the risk of several life-threatening complications. However, there are no randomized, controlled studies on eCPR, and valid predictors of benefit and outcome are lacking. Therefore, optimal timing, patient selection, location and method of implementation vary across centers. As utilization of eCPR has increased in recent years and more centers begin to perform eCPR, considerable uncertainties exist in the prehospital setting as well as in the emergency room. However, structured communication and clearly defined processes are essential especially at the interface between prehospital rescue teams and the eCPR team to achieve the highest possible benefit for cardiac arrest patients using eCPR. This article presents an algorithm for structured, evidence-based logistic considerations, patient selection, and implementation of eCPR as well as early care after establishment of extracorporeal life support (ECLS) which are mainly based on the German national recommendations for eCPR of DGIIN, DGK, DGTHG, DGfK, DGNI, DGAI, DIVI and GRC published in 2019 as well as the S3 guideline "Use of extracorporeal circulation (ECLS/ECMO) for cardiac and circulatory failure" and local standard operating procedures of the authors.

8. Am J Emerg Med. 2022 Sep 30:S0735-6757(22)00614-3. doi: 10.1016/j.ajem.2022.09.042. Online ahead of print.
Favorable outcome of extracorporeal cardiopulmonary resuscitation in patients with subsequent shockable rhythm and preserved gasping.
Tsai HY(1), Ho MP(2).
NO ABSTRACT AVAILABLE

EXPERIMENTAL RESEARCH

No articles identified.

CASE REPORTS

1. J Emerg Med. 2022 Oct 12:S0736-4679(22)00430-9. doi: 10.1016/j.jemermed.2022.07.005. Online ahead of print.

6-Year-Old Male Drowning Complicated by Cardiac Arrest and Ensuing Metabolic and Respiratory Acidosis: Should Presence of Pulses Lead Clinicians to Pursue Prolonged Cardiopulmonary Resuscitation?

Livshits D(1), George M(1), Sokup B(1), Jeong J(1), Patel N(1), Kindschuh M(1).

ABSTRACT

BACKGROUND: Drowning is one of the leading causes of death in the pediatric population. Patients arriving to the emergency department (ED) with submersion injuries are often asymptomatic and well-appearing, but can sometimes present critically ill and require prolonged resuscitation. The question of how long to continue resuscitation of a pediatric patient with a submersion injury is a difficult question to answer. CASE REPORT: We present a case of 6-year-old boy was found by his friends submerged in sea water for 10-15 min. The patient was rescued by lifeguards and evaluated by emergency medical personnel, who found him breathing spontaneously but unresponsive. En route to hospital, the patient became apneic, cardiopulmonary resuscitation (CPR) was started, and the patient was intubated. The patient arrived to the ED in cardiopulmonary arrest, CPR was continued and epinephrine was administered. Return of spontaneous circulation was achieved after 42 min in the ED. Initial laboratory test results showed severe acidosis and chest x-ray study showed diffuse interstitial edema. Ventilator settings were adjusted in accordance with lung protective ventilation strategies and the acidosis began to improve. Over the next several days, the patient was weaned to noninvasive ventilation modalities and eventually made a complete neurologic recovery and continued to be a straight-A student. Why Should an Emergency Physician Be Aware of This? We make the case that, in select drowning patients, duration of CPR longer than 30 min can potentially result in favorable neurologic outcomes. Prolonged CPR should be especially strongly considered in patients with a pulse at any point during evaluation. With the combination of prolonged CPR and judicious use of lung protective mechanical ventilation strategies, we were able to successfully treat the patient in our case.

2. Clin Case Rep. 2022 Oct 3;10(10):e6398. doi: 10.1002/ccr3.6398. eCollection 2022 Oct.

Left main and two vessels calcified coronary aneurysms presented as out of hospital cardiac arrest in young patient.

Al Khodari K(1), Tahtouh RA(2), Arabi A(1), Al Khodari M(3).

ABSTRACT

A 37-year-old patient was admitted secondary to ventricular fibrillation induced out of hospital cardiac arrest. Coronary angiogram revealed left main, left anterior descending, and right coronary arteries aneurysms. The patient underwent bypass surgery with four grafts. Ejection fraction improved from 30% upon admission to 45% at 3 months of follow-up.

3. Wilderness Environ Med. 2022 Oct 6:S1080-6032(22)00107-7. doi: 10.1016/j.wem.2022.06.002. Online ahead of print.

Two Cases of Severe Amanita Muscaria Poisoning Including a Fatality.

Meisel EM(1), Morgan B(2), Schwartz M(3), Kazzi Z(2), Cetin H(4), Sahin A(5).

ABSTRACT

Ingestion of Amanita muscaria mushrooms results in transient central nervous system excitation and depression mediated by its components, ibotenic acid and muscimol. The mushroom is distributed worldwide and ingestions occur with some frequency. Although these ingestions have traditionally been considered benign, serious complications can occur. We present 2 cases of serious toxicity, including a fatality. The first case was a 44-y-old man who presented to the emergency department (ED) after cardiopulmonary arrest approximately 10 h after ingesting 4 to 5 dried A muscaria mushroom caps, which he used for their mind-altering effects. Despite successful resuscitation, he remained unresponsive and hypotensive and died 9 days later. The second case was a 75-y-old man who presented to the ED after accidentally consuming one large A muscaria mushroom cap he foraged in Eastern Turkey. The patient initially presented to the ED with hallucinations followed by lethargy, and he was intubated for airway protection. The patient's condition gradually improved, and he made a full recovery. A muscaria ingestion should not be considered benign as serious outcomes do occur. An understanding of how the main neuroactive chemicals, ibotenic acid and muscimol, affect the brain can help anticipate outcomes. Several high-risk features that portend a more serious course are identified.

4. Int J Environ Res Public Health. 2022 Sep 27;19(19):12223. doi: 10.3390/ijerph191912223.

Cardiac Arrest after Small Doses Ropivacaine: Local Anesthetic Systemic Toxicity in the Course of Continuous Femoral Nerve Blockade.

Gola W(1), Bialka S(2), Zajac M(3), Misiolek H(2).

ABSTRACT

BACKGROUND: The paper presents a case report of an episode of local anesthetic systemic toxicity (LAST) with cardiac arrest after continuous femoral nerve blockade. CASE REPORT: A 74-year-old patient burdened with hypertension and osteoarthritis underwent elective total knee replacement surgery. After surgery, a continuous femoral nerve blockade was performed and an infusion of a local anesthetic (LA) was started using an elastomeric pump. Five hours after surgery, the patient had an episode of generalized seizures followed by cardiac arrest. After resuscitation, spontaneous circulation was restored. In the treatment, 20% lipid emulsion was used. On day two of the ICU stay, the patient was fully cardiovascularly and respiratorily stable without neurological deficits and was discharged to the orthopedic department to continue treatment. CONCLUSION: Systemic toxicity of LA is a serious and potentially fatal complication of the use of LA in clinical practice. It should be noted that in nearly 40% of patients, LAST deviates from the classic and typical course and may have an atypical manifestation, and the first symptoms may appear with a long delay, especially when continuous blockades are used. Therefore, the proper supervision of the patient and the developed procedure in the event of LAST is undoubtedly important here.

5. Am J Emerg Med. 2022 Sep 30:S0735-6757(22)00608-8. doi: 10.1016/j.ajem.2022.09.036. Online ahead of print.

Keep shocking: A case report of double sequential defibrillation for refractory ventricular fibrillation.

Mohamed AK(1), Nayaz MS(2), Nawaz A(2), Kapadia C(3).

ABSTRACT

Double sequential defibrillation is proposed as a novel modality of managing refractory ventricular fibrillation (VF). However, existing evidence has not been enough to support this. Here, we report an interesting case of a 54-year-old male who suffered from cardiac arrest with VF rhythm. The patient

did not respond to 11 consecutive shocks along with antiarrhythmic medications. However, double sequential defibrillation terminated the VF. He had another episode of VF unresponsive to thirty minutes of standard defibrillation on his way to the catheterization laboratory. Again, the VF was terminated by double sequential defibrillation. Five days later, the patient was discharged home without neurological sequels.

6. Methodist Debakey Cardiovasc J. 2022 Sep 20;18(1):68-72. doi: 10.14797/mdcvj.1067. eCollection 2022.

A Case of Cardiac Arrest Caused by Air Embolism from Routine Root Canal Procedure.

Parekh A(1)(2), McCormick J(1)(3), Hussain-Amin A(1)(3), Barnosky B(1)(4), Edwards M(1)(2).

ABSTRACT

Venous air embolism (VAE) occurs when air is introduced into the venous system and subsequently travels into the right heart and pulmonary circulation. VAE mainly occurs from air that is forced by positive pressure or drawn in by negative pressure. We present a rare case of fatal VAE that occurred during a routine dental root canal procedure. A 69-year-old male was undergoing a root canal procedure at an outpatient dental office under local anesthesia. During the procedure, he went into cardiopulmonary arrest. He was resuscitated, and return of spontaneous circulation was achieved. Thoracic computed tomography was performed and revealed large amounts of air within the right ventricle and portal venous system. VAE should be recognized as a potentially fatal complication resulting from routine dental procedures.