This week's PubMed 20th – 26th November 2022: articles of interest n = 45

CPR AND COVID-19

No articles identified.

CPR/MECHANICAL CHEST COMPRESSION

1. Med Klin Intensivmed Notfmed. 2022 Nov 24. doi: 10.1007/s00063-022-00970-0. Online ahead of print.

[Ethical aspects of mechanical resuscitation in a child : Results of an expert workshop within the BMBF project CLAIRE-Children's Automated Intelligent Resuscitation].

[Article in German; Abstract available in German from the publisher]

Zill M(1), Eimer C(2), Rogge A(3)(4), Bathe J(5), Hoffmann F(6), Lorenzen U(2), Reifferscheid F(2)(7), Hossfeld B(8), Schimpf J(9), Grünewald M(2)(10), Gräsner JT(5)(2), Seewald S(5)(2).

ABSTRACT

BACKGROUND: While the use of mechanical resuscitation devices can be considered for adult resuscitation, the European Resuscitation Council guidelines do not yet mention their use for pediatric resuscitation. Only one device has been partially approved for use in children; further pediatric appliances are currently being used off-label. Ethical considerations arising from the use of mechanical resuscitation devices have not yet been presented in a structured way. OBJECTIVE: To elaborate ethical considerations in the development phase of mechanical resuscitation devices for children. METHODS: Based on several fictitious case reports, an interdisciplinary expert focus group discussion was conducted. This was followed by a moderated discussion, summarizing the results. Guiding principles and research desiderata were formulated using these results as well as existing literature. RESULTS: According to the group of experts, ethical considerations regarding mechanical resuscitation devices in pediatrics predominantly concern the subject of indication and discontinuation criteria. Ethical aspects concerning psychosocial impacts on affected families and intervention teams cannot be generalized and need to be analyzed on a case-by-case basis. CONCLUSION: The considerations presented regarding the use of mechanical resuscitation devices in the pediatric context, which is still in its developmental stage, could also have practical implications for adult out-of-hospital resuscitation decisions. Concerning ethical aspects of out-of-hospital resuscitation decisions, especially using mechanical resuscitation devices, the need for accompanying empirical research is substantial.

2. Pak J Med Sci. 2022 Nov-Dec;38(8):2208-2214. doi: 10.12669/pjms.38.8.6598.

Comparison between automated cardiopulmonary resuscitation and manual cardiopulmonary resuscitation in the rescue of cardiac and respiratory arrest.

Gao M(1), Niu H(2), Yuan S(3).

ABSTRACT

OBJECTIVE: To compare the efficacy of automated cardiopulmonary resuscitation (A-CPR) and manual cardiopulmonary resuscitation (M-CPR) in the rescue of cardiac and respiratory arrest. METHODS: A retrospective, single-center observational study was conducted to identify 106 patients by reviewing medical records of 269 patients with cardiac and respiratory arrest treated in The Second Hospital of Hebei Medical University, Shandong Provincial Third Hospital (Jinan, China) from February 2019 to February 2021. Patients were divided into A-CPR group (n = 55) and M-CPR group (n = 51) based on the resuscitation treatment method. The groups were matched for age, gender

and the cause of cardiac arrest. Rescue effects, blood gas analysis indicators, respiratory dynamics and condition improvement of the two groups were compared. RESULTS: In terms of rescue effects, return of spontaneous circulation (ROSC) rate, successful rate of cardiopulmonary resuscitation (CPR), 24-hour survival rate and survival discharge rate in the A-CPR group were higher than M-CPR group ($P<0.05$). With respect to blood gas analysis indicators and respiratory dynamics, the partial pressure of carbon dioxide ($PaCO_2$) in the A-CPR group was lower than M-CPR group at 15 and 30 minutes after CPR, while the partial pressure of oxygen (PaO_2), blood oxygen saturation (SaO_2), end expiratory carbon dioxide ($PetCO_2$), coronary perfusion pressure (CPP) and mean arterial pressure (MAP) in the A-CPR group were higher than M-CPR group ($P<0.05$). In aspect of condition improvement, spontaneous breathing, heart rate, spontaneous circulation, blood pressure recovery time and CPR time in the A-CPR group were shorter than M-CPR group ($P<0.05$). CONCLUSION: The application effect of A-CPR in the rescue of cardiac and respiratory arrest, the improvement of blood gas analysis indexes, respiration and condition improvement are more significant than M-CPR.

REGISTRIES, REVIEWS AND EDITORIALS

1. Ugeskr Laeger. 2022 Nov 21;184(47):V05220356.

Improving survival after out-of-hospital cardiac arrest. [Article in Danish]

Gregers MCT(1)(2), Kjølbye JS(1)(2), Jacobsen LK(1)(2), Linderoth G(1)(3), Andelius L(1), Hansen CM(1)(4), Blomberg SNF(1), Torp-Pedersen C(5)(6), Lippert F(1), Folke F(1)(7).

ABSTRACT

During the past 20 years the survival after out-of-hospital cardiac arrest (OHCA) has almost quadrupled from 4% in 2001 to 14% in 2020. There has been a huge focus on layman education in cardiopulmonary resuscitation and use of automated external defibrillators (AED), implementation of healthcare staff at 1-1-2 dispatch centers, early recognition of OHCA, establishment of a national AED register with publicly available AEDs, and dispatch of volunteer responders in case of nearby OHCA. This review describes implemented initiatives with the purpose of improving survival from OHCA in Denmark.

2. Resuscitation. 2022 Nov 21:S0300-9572(22)00720-1. doi: 10.1016/j.resuscitation.2022.11.014. Online ahead of print.

Development of the epidemiology and outcomes of out-of-hospital cardiac arrest using data from the German Resuscitation Register over a 15-year period (EpiCPR study).

Hubar I(1), Fischer M(2), Monaco T(1), Gräsner JT(3), Westenfeld R(4), Bernhard M(5).

ABSTRACT

BACKGROUND: Sudden cardiac arrest is a relevant problem with a significant number of deaths in Europe. AIM: Using data from the German Resuscitation Register (GRR), we examined changes in epidemiology and therapeutic interventions over a 15-year period in order to identify key factors contributing to favourable outcome in out-of-hospital cardiac arrest (OHCA) patients. METHODS: GRR data were analysed in 5-year periods (2006-2010 vs. 2011-2015 vs. 2016-2020) representing changes in the European Resuscitation Council (ERC) guidelines. Group comparison of OHCA patients was made for epidemiological and resuscitation-associated factors. Endpoints included 30-day survival and hospital discharge with a good neurological outcome (CPC 1,2). Matched-pair analysis compared outcomes, and multivariate binary logistic regression analysis identified variables with effects on survival. RESULTS: A total of 42,997 GRR patients were studied (2006-2010: n=3,471, 2011-2015: n=16,122, 2016-2020: n=23,404). Proportion of patients over 80 years, use of intraosseous (IO) access and supraglottic airway devices, rate of bystander CPR, and the proportion

of telephone CPR increased over the study period. The 30-day survival, and hospital discharge rates with CPC1/2 were unchanged. After adjusting cohorts using matched pairs, a higher CPC1,2 rate was observed (8.8 vs. 10.2%, p<0.03). Logistic regression analysis showed that IO and SAD had an unfavourable impact on outcome. CONCLUSION: Despite a significant increase in bystander and telephone CPR rates, no improvement in 30-day survival and hospital discharge rate with CPC1,2 was observed. Initial rhythm (VF/VT), cardiac and hypoxic cause of CA, bystander CPR and IV access were identified as factors associated with a favourable neurological outcome.

3. Resuscitation. 2022 Nov 18:S0300-9572(22)00714-6. doi: 10.1016/j.resuscitation.2022.11.008. Online ahead of print.

Outcomes Associated with Intra-Arrest Hyperoxaemia in Out-of-Hospital Cardiac Arrest: A Registry-Based Cohort Study.

Izawa J(1), Komukai S(2), Nishioka N(3), Kiguchi T(4), Kitamura T(5), Iwami T(3).

ABSTRACT

BACKGROUND: An association between post-arrest hyperoxaemia and worse outcomes has been reported for out-of-hospital cardiac arrest (OHCA) patients, but little is known about the relationship between intra-arrest hyperoxaemia and clinically relevant outcomes. This study aimed to investigate the association between intra-arrest hyperoxaemia and outcomes for OHCA patients. METHODS: This was an observational study using a registry database of OHCA cases that occurred between 2014 and 2017 in Japan. We included adult, non-traumatic OHCA patients who were in cardiac arrest at the time of hospital arrival and for whom partial pressure of arterial oxygen (PaO2) levels was measured during resuscitation. Main exposure was intra-arrest PaO2 level, which was divided into three categories: hypoxaemia, PaO2 <60 mmHg; normoxaemia, 60-300; or hyperoxaemia, ≥300. Primary outcome was favourable functional survival at one month or at hospital discharge. Multivariable logistic regression was performed to adjust for clinically relevant variables. RESULTS: Among 16,013 patients who met the eligibility criteria, the proportion of favourable functional survival increased as the PaO2 categories became higher: 0.5% (57/11,484) in hypoxaemia, 1.1% (48/4243) in normoxaemia, and 5.2% (15/286) in hyperoxaemia (p-value for trend <0.001). Higher PaO2 categories were associated with favourable functional survival and the adjusted odds ratios increased as the PaO2 categories became higher: 2.09 (95% CI: 1.39-3.14) in normoxaemia and 5.04 (95% CI: 2.62-9.70) in hyperoxaemia when compared to hypoxaemia as a reference. CONCLUSION: In this observational study of adult OHCA patients, intra-arrest and hyperoxaemia were associated with better functional survival, compared to hypoxaemia.

4. Acad Emerg Med. 2022 Nov;29(11):1381-1382. doi: 10.1111/acem.14569. Epub 2022 Aug 13.

Evaluation of National Institutes of Health cardiac arrest research based on "chain of survival" links.

Coute RA(1), Mader TJ(2), Kurz MC(1).

NO ABSTRACT AVAILABLE

5. Intensive Care Med Exp. 2022 Nov 25;10(1):50. doi: 10.1186/s40635-022-00478-z.

Knowledge gaps and research priorities in adult veno-arterial extracorporeal membrane oxygenation: a scoping review.

Raasveld SJ(1), Volleman C(1)(2), Combes A(3)(4), Broman LM(5)(6), Taccone FS(7), Peters E(8), Ten Berg S(8), van den Brom CE(1)(2)(9), Thiele H(10), Lorusso R(11), Henriques JPS(8), Vlaar APJ(12).

ABSTRACT

PURPOSE: This scoping review aims to identify and describe knowledge gaps and research priorities in veno-arterial extracorporeal membrane oxygenation (VA-ECMO). METHODS: An expert panel was

recruited consisting of eight international experts from different backgrounds. First, a list of priority topics was made. Second, the panel developed structured questions using population, intervention, comparison and outcomes (PICO) format. All PICOs were scored and prioritized. For every selected PICO, a structured literature search was performed. RESULTS: After an initial list of 49 topics, eight were scored as high-priority. For most of these selected topics, current literature is limited to observational studies, mainly consisting of retrospective cohorts. Only for ECPR and anticoagulation, randomized controlled trials (RCTs) have been performed or are ongoing. Per topic, a summary of the literature is stated including recommendations for further research. CONCLUSIONS: This scoping review identifies and presents an overview of knowledge gaps and research priorities in VA-ECMO. Current literature is mostly limited to observational studies, although with increasing attention for this patient population, more RCTs are finishing or ongoing. Translational research, from preclinical trials to high-quality or randomized controlled trials, is important to improve the standard practices in this critically ill patient population. Take-home message This scoping review identifies and presents an overview of research gaps and priorities in VA-ECMO. Translational research, from preclinical trials to high-quality or randomized controlled trials, is important to improve the standard practices in this critically ill patient population.

IN-HOSPITAL CARDIAC ARREST

1. Mayo Clin Proc Innov Qual Outcomes. 2022 Nov 18;6(6):636. doi: 10.1016/j.mayocpiqo.2021.12.001. eCollection 2022 Dec.
Corrigendum to 'Association Between Hospital Resuscitation Team Leader Credentials and Survival Outcomes for In-Hospital Cardiac Arrest' [Mayo Clinic Proceedings Innovation Quality Outcomes, 2021, Vol 5, Issue 6, Pages 1021-1028, Article Number: doi: 10.1016/j.mayocpiqo.2021.06.002].
Hejjaji V(1)(2), Chakrabarti AK(3), Nallamothu BK(3)(4), Iwashyna TJ(3)(4), Krein SL(3)(4), Trumpower B(3), Kennedy M(1), Chinnakondepalli K(1), Malik AO(1)(2), Chan PS(1)(2).
NO ABSTRACT AVAILABLE

2. Arch Dis Child. 2022 Dec;107(12):1121. doi: 10.1136/archdischild-2022-325088.
Collaboration, bundles and preventing in hospital cardiac arrests.
[No authors listed]
NO ABSTRACT AVAILABLE

INJURIES AND CPR

1. Rev Assoc Med Bras (1992). 2022 Nov 21;68(10):1470-1475. doi: 10.1590/1806-9282.20220822. eCollection 2022.
Relationship between measures of thoracic diameter and cardiopulmonary resuscitation-induced thoracoabdominal injury.
Ümit TB(1), Sogut O(1), Az A(1), Cakmak S(2), Demirel I(1).
ABSTRACT
OBJECTIVE: We investigated the relationship between thoracic diameters and chest compression-related thoracoabdominal injury in patients with non-traumatic out-of-hospital cardiac arrest who had a return of spontaneous circulation after cardiopulmonary resuscitation. METHODS: A total of 63 consecutive adult non-traumatic out-of-hospital cardiac arrest patients were enrolled in this prospective study. Computed tomography was performed on each patient and the anteroposterior diameter, skin-to-skin anteroposterior diameter, and transverse diameter of the chest were measured. Patients were divided into two groups based on the presence or absence of

cardiopulmonary resuscitation-related thoracoabdominal injury. Age, sex, and duration of cardiopulmonary resuscitation, anteroposterior diameter, skin-to-skin anteroposterior diameter, and transverse diameter were compared between the groups. The primary outcome was the relationship between thoracic diameters and cardiopulmonary resuscitation-induced thoracoabdominal injuries. RESULTS: Thoracoabdominal injuries were detected in 46% (n=29) of the patients and consisted of rib fractures in 22 (34.9%) patients, pulmonary contusion in 7 (11.1%), and sternal fracture in 3 (4.8%) patients. There were no significant differences in cardiopulmonary resuscitation duration between patients with and without thoracoabdominal injuries (p=0.539). Similarly, there were no significant differences in anteroposterior diameter, skin-to-skin anteroposterior diameter, or transverse diameter between patient groups (p=0.978, p=0.730, and p=0.146, respectively) or between patients who died within the first 28 days and those who survived for longer than 28 days (p=0.488, p=0.878, and p=0.853, respectively). CONCLUSION: The iatrogenic thoracoabdominal injuries caused by cardiopulmonary resuscitation performed according to the cardiopulmonary resuscitation guidelines were independent of thoracic diameters. Therefore, the cardiac compression depth of 5-6 cm recommended by the current cardiopulmonary resuscitation guidelines is reliable for patients with different thoracic diameters.

CAUSE OF THE ARREST

1. Resusc Plus. 2022 Nov 17;12:100333. doi: 10.1016/j.resplu.2022.100333. eCollection 2022 Dec.
Out-of-hospital cardiac arrest complicated by hyperthermia.
Edwards T(1), Rees P(2).

ABSTRACT
BACKGROUND: The aims of this study were to establish epidemiology, clinical management and outcomes in cases of adult out-of-hospital cardiac arrest complicated by hyperthermia attended by the London Ambulance Service NHS Trust between January 2018 and December 2019. Where evidence is available in relation to this sub-set of cardiac arrest patients it is generally limited to small case series and we therefore we sought to improve knowledge and target therapeutic interventions. METHODS AND RESULTS: Retrospective analysis of 253 cases was undertaken following abstraction from an established cardiac arrest database. Age ranged from 18-99 years with a median of 72 years (IQR 28) and 53.4% (n = 135) of patients were female. Overall thirty-day mortality was 94.5% (n = 239), with 48.2% (n = 122) of patients recognised life extinct in the out-of-hospital phase following termination of resuscitation. No significant differences in clinical characteristics stratified according to temperature group were identified. The presumed aetiology was infective in 62.8% (n = 159) of patients, and due to drug ingestion or heat illness in 7.5% (n = 19) and 2% (n = 5) respectively. In the remaining cases (27.7%, n = 70) it was not possible to determine the likely cause of the arrest. CONCLUSIONS: Previous research relating to cardiac arrest complicated by hyperthermia is limited to case reports and small case series, suggesting that the current study represents the most comprehensive analysis of this sub-group of out-of-hospital cardiac arrest patients currently available. Most cases were associated with evidence of infection compared with drug related aetiologies and heat illness. Where indicated, cooling was applied infrequently using inconsistent methods.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

1. Perfusion. 2022 Nov 20:2676591221140237. doi: 10.1177/02676591221140237. Online ahead of print.

Feasibility and performance of a combined extracorporeal assisted cardiac resuscitation and an organ donation program after uncontrolled cardiocirculatory death (Maastricht II).

Nobre de Jesus G(1)(2), Neves I(1), Gouveia J(1), Ribeiro J(1).

ABSTRACT

INTRODUCTION: Approximately 500.000 people in Europe sustain cardiac arrest (CA) every year, being myocardial infarction the main etiology. Interest has been raised in a new approach to refractory cardiac arrest (rCA) using extra-corporeal oxygenation (ECMO). In settings where it can be rapidly implemented, ECMO assisted resuscitation (ECPR) may be considered. Additionally, donation after circulatory death, which seeks to obtain solid organs donation from patients suffering rCA, has increased its role effectively increasing the pool of donors. Combined programs with integration of ECPR and uncontrolled donation after circulatory determination of death (uDCDD) are worldwide limited and experience integrating these two techniques is lacking. METHODS: We report a 24 months experience of ECPR and uDCDD kidney transplantation based on a management protocol in a university teaching hospital in the urban area of Lisbon. RESULTS: Over a period of 24 months, 58 patients were admitted to our ICU with rCA, 6 (10%) in the ECPR program and 52 (90%) in the uDCDD. Seventy-eight percent of patients were male, with an average age of 49 year-old. CA was witnessed in 83% of cases and initial rhythm was ventricular fibrillation in 20 cases (35%). 13 (25%) patients were effective organ donors. Refusal for effective donation was mainly due to prior comorbidities. DISCUSSION: The development of an integrated program for ECPR and uDCDD is feasible and requires a well-established and efficient activation program. In an era of significant organ shortage, it provides a viable option for increasing the organ donation pool, with promising results**.**

FEEDBACK

1. Int J Environ Res Public Health. 2022 Nov 18;19(22):15228. doi: 10.3390/ijerph192215228.

Development and Validation of a Novel Ultra-Compact and Cost-Effective Device for Basic Hands-On CPR Training: A Randomized, Sham-Controlled, Blinded Trial.

Rabanales-Sotos J(1)(2), Guisado-Requena IM(1)(2), Leiton-Espinoza ZE(3), Guerrero-Agenjo CM(4), López-Torres-Hidalgo J(5), Martín-Conty JL(6), Martín-Rodriguez F(7), López-Tendero J(4), López-González A(1)(2).

ABSTRACT

To examine the performance of a novel low-cost, ultra-compact, and attractive auditory feedback device for training laypeople in external chest compressions (ECCs), we conducted a quasi-experimental cross-sectional study from September to November 2021 at the Faculty of Nursing of Albacete, University of Castille-La Mancha, Spain. The ECC sequence was performed in the laboratory with the new device for basic hands-on CPR training. Results: One hundred college students were included in this study. The compression rate/min with the new device was 97.6, and the adequate %ECC was 52.4. According to the status of body mass index (BMI) and muscle strength of the upper limbs in the bivariate analysis, it was observed that the new device discriminated between those who performed correct ECCs according to their BMI and muscle strength and those who did not, which led to significantly influenced results in terms of the percentage of ECCs with correct depth. Conclusions: The new ultra-compact auditory feedback device "Salvando a Llanetes®"

demonstrated utility for teaching and learning ECCs in basic CPR. We can affirm that the analyzed device is an adequate, safe and economical method for teaching "CPR Hands-Only™" to the general population.

DRUGS

1. Trials. 2022 Nov 22;23(1):952. doi: 10.1186/s13063-022-06838-0.

Steroid treatment as anti-inflammatory and neuroprotective agent following out-of-hospital cardiac arrest: a randomized clinical trial.

Obling LER(1)(2), Beske RP(3)(4), Wiberg S(5), Folke F(6)(7), Moeller JE(3)(4), Kjaergaard J(3)(4), Hassager C(3)(4).

ABSTRACT

BACKGROUND: Patients resuscitated from out-of-hospital cardiac arrest (OHCA) have a high morbidity and mortality risk and often develop post-cardiac arrest syndrome (PCAS) involving systemic inflammation. The severity of the inflammatory response is associated with adverse outcome, with anoxic irreversible brain injury as the leading cause of death following resuscitated OHCA. The study aimed to investigate the anti-inflammatory and neuroprotective effect of pre-hospital administration of a high-dose glucocorticoid following OHCA. METHODS: The study is an investigator-initiated, randomized, multicenter, single-blinded, placebo-controlled, clinical trial. Inclusion will continue until one hundred twenty unconscious OHCA patients surviving a minimum of 72 h are randomized. Intervention is a 1:1 randomization to an infusion of methylprednisolone 250 mg following a minimum of 5 min of sustained return of spontaneous circulation in the pre-hospital setting. Methylprednisolone will be given as a bolus infusion of 1 × 250 mg (1 × 4 mL) over a period of 5 min. Patients allocated to placebo will receive 4 mL of isotonic saline (NaCl 0.9%). Main eligibility criteria are OHCA of presumed cardiac cause, age ≥ 18 years, Glasgow Coma Scale ≤ 8, and sustained ROSC for at least 5 min. Co-primary endpoint: Reduction of interleukin-6 and neuron-specific-enolase. Secondary endpoints: Markers of inflammation, brain, cardiac, kidney and liver damage, hemodynamic and hemostatic function, safety, neurological function at follow-up, and mortality. A research biobank is set up with blood samples taken daily during the first 72 h from hospitalization to evaluate primary and secondary endpoints. DISCUSSION: We hypothesize that early anti-inflammatory steroid treatment in the pre-hospital setting can mitigate the progression of PCAS following resuscitated OHCA. Primary endpoints will be assessed through analyses of biomarkers for inflammation and neurological damage taken during the first 72 h of admission.

2. Resuscitation. 2022 Nov 17:S0300-9572(22)00713-4. doi: 10.1016/j.resuscitation.2022.11.007. Online ahead of print.

Sodium Bicarbonate Administration is Associated with Improved Survival in Asystolic and PEA Out-of-Hospital Cardiac Arrest.

Niederberger SM(1), Crowe RP(2), Salcido DD(3), Menegazzi JJ(4).

ABSTRACT

BACKGROUND: Sodium bicarbonate ("bicarb") administration in out-of-hospital cardiac arrest (OHCA) is intended to counteract acidosis, although there is limited clinical evidence to support its routine administration. We sought to analyze the association of bicarb with resuscitation outcomes in non-traumatic OHCA. METHODS: Records were obtained from the 2019-2020 ESO Data Collaborative prehospital electronic health record database, spanning 1,322 agencies in 50 states. OHCAs with resuscitations lasting 5-40 minutes were stratified by presenting ECG rhythm (VF/VT, pulseless electrical activity (PEA), asystole) for analysis. The outcomes of any prehospital ROSC and survival to discharge were compared by bicarb status using propensity score matching and logistic

regressions with/without adjustment. RESULTS: We analyzed 23,567 records, 6,663 (28.3%) of which included bicarb administration. Most patients presented in asystole (67.4%), followed by PEA (16.6%), and VF/VT (15.1%). In the propensity-matched cohort, ROSC was higher in the bicarb group for the asystole group (bicarb 10.6% vs control 8.8%; p=0.013), without differences in the PEA or VF/VT groups. Survival was higher in the bicarb group for asystole (bicarb 3.3% vs control 2.4%; p=0.020) and for PEA (bicarb 8.1% vs control 5.4%; p=0.034), without differences in the VF/VT group. These results were consistent across adjusted/unadjusted logistic regression analyses: bicarb was associated with ROSC and survival in asystole [uOR (95% CI): ROSC 1.23 (1.04-1.44), survival 1.40 (1.05-1.87)] and with survival in PEA (1.54 (1.03-2.31). CONCLUSIONS: Bicarb was associated with survival in non-shockable rhythms and ROSC in asystole. Findings from this observational study should be corroborated with prospective randomized work.

3. Resuscitation. 2022 Nov 17:S0300-9572(22)00712-2. doi: 10.1016/j.resuscitation.2022.11.006. Online ahead of print.

Effect of Calcium in Patients with Pulseless Electrical Activity and Electrocardiographic Characteristics Potentially Associated with Hyperkalemia and Ischemia-Sub-study of the Calcium for Out-of-hospital Cardiac Arrest (COCA) trial.

Fink Vallentin M(1), Ling Povlsen A(2), Granfeldt A(3), Juhl Terkelsen C(4), Andersen LW(5).

ABSTRACT

OBJECTIVE: The Calcium for Out-of-hospital Cardiac Arrest (COCA) trial was recently conducted and published. This pre-planned sub-study evaluated the effect of calcium in patients with pulseless electrical activity (PEA) including subgroup analyses based on electrocardiographic characteristics potentially associated with hyperkalemia and ischemia. METHODS: Patients aged ≥ 18 years were included if they had a non-traumatic out-of-hospital cardiac arrest and received adrenaline. The trial drug consisted of calcium chloride (5 mmol) or saline placebo given after the first, and again after the second, dose of adrenaline for a maximum of two doses. This sub-study analyzed patients with PEA as their last known rhythm prior to receiving the trial drug. Outcomes were return of spontaneous circulation and survival at 30 days. RESULTS: 104 patients were analyzed. In the calcium group, 9 patients (20%) achieved return of spontaneous circulation vs. 23 patients (39%) in the placebo group (risk ratio 0.51; 95%CI 0.26, 1.00). Subgroup analyses based on electrocardiographic characteristics potentially associated with hyperkalemia and ischemia showed similar results. At 30 days, 1 patient (2.2%) was alive in the calcium group while 8 patients (13.6%) were alive in the placebo group (risk ratio 0.16; 95%CI 0.02, 1.26). CONCLUSION: In adults with out-of-hospital cardiac arrest presenting with PEA, effect estimates suggested harm of calcium administration as compared to placebo but with wide confidence intervals. Results were consistent for electrocardiographic characteristics potentially associated with hyperkalemia and ischemia. The results do not support calcium administration based strictly on electrocardiographic findings seen during out-of-hospital cardiac arrest.

TRAUMA

No articles identified.

VENTILATION

1. Am J Emerg Med. 2022 Nov 17;64:26-36. doi: 10.1016/j.ajem.2022.11.003. Online ahead of print.

Continuous compression with asynchronous ventilation improves CPR prognosis? A meta-analysis from human and animal studies.

Sun M(1), Zhu A(2), Tang Y(1).

ABSTRACT

BACKGROUND: The cardiopulmonary resuscitation (CPR) compression to ventilation strategy remains controversial. We conducted a meta-analysis to compare the outcomes between continuous chest compressions CPR with asynchronous ventilation (CCC-CPR) and interrupted chest compressions CPR with synchronous ventilation (ICC-CPR) in cardiac arrest. METHODS: PubMed, Web of Science, Embase, MEDLINE (Ovid/LWW) and the Cochrane Libraries were searched up from inception to July 31, 2022. Human and animal studies comparing CCC-CPR versus ICC-CPR were included. Outcome variables were return of spontaneous circulation (ROSC), time to ROSC, survival to discharge, 1-month survival, survival at 4 h, good neurological function, mean arterial pressure (MAP) and other clinical parameters. Jadad Scale and Newcastle-Ottawa Scale were used to assess the study quality and risk of bias. RESULTS: The systematic search identified eight studies on humans and twelve studies on animal trials. There were no significant differences in ROSC (odd ratios [OR] 1.07; 95% confidence interval [CI]: 0.86-1.32; P = 0.55), survival to hospital discharge (OR 1.04; 95%CI 0.77-1.42; P = 0.79), 1-month survival (OR 1.07; 95%CI 0.84-1.36; P = 0.57), and good neurological outcome (OR 0.92; 95%CI 0.84-1.01, P = 0.09) between CCC-CPR and ICC-CPR in human studies. In animal trials, CCC-CPR had significantly higher rate of ROSC (OR = 1.81; 95% CI: 0.94-3.49; P = 0.07), survival at 4 h (OR 2.57; 95% CI: 1.16-5.72; P = 0.02) and MAP (mean difference [MD] 0.79, 95% CI: 0.04-1.53; P = 0.04), even though no significant differences in ROSC time, arterial potential of hydrogen (pH) and partial tension of carbon dioxide (PaCO2). CONCLUSION: CCC-CPR did not show superiority in human outcomes compared with ICC-CPR, but its effect value was significantly increased in animal experiments. We should take the positive outcomes from animals and apply them to human models, and more physiological mechanisms need to be confirmed in CPR patients with different compression-ventilation strategies to improve the prognosis of cardiac arrest.

CERERBRAL MONITORING

1. Eur Radiol. 2022 Nov 24. doi: 10.1007/s00330-022-09245-w. Online ahead of print.

Free water corrected diffusion tensor imaging discriminates between good and poor outcomes of comatose patients after cardiac arrest.

Keijzer HM(1)(2), Duering M(3)(4), Pasternak O(5), Meijer FJA(6), Verhulst MMLH(7)(8), Tonino BAR(9), Blans MJ(10), Hoedemaekers CWE(11), Klijn CJM(12), Hofmeijer J(7)(8).

ABSTRACT

OBJECTIVES: Approximately 50% of comatose patients after cardiac arrest never regain consciousness. Cerebral ischaemia may lead to cytotoxic and/or vasogenic oedema, which can be detected by diffusion tensor imaging (DTI). Here, we evaluate the potential value of free water corrected mean diffusivity (MD) and fractional anisotropy (FA) based on DTI, for the prediction of neurological recovery of comatose patients after cardiac arrest. METHODS: A total of 50 patients after cardiac arrest were included in this prospective cohort study in two Dutch hospitals. DTI was obtained 2-4 days after cardiac arrest. Outcome was assessed at 6 months, dichotomised as poor (cerebral performance category 3-5; n = 20) or good (n = 30) neurological outcome. We calculated the whole brain mean MD and FA and compared between patients with good and poor outcomes. In addition, we compared a preliminary prediction model based on clinical parameters with or without the addition of MD and FA. RESULTS: We found significant differences between patients with good and poor outcome of mean MD (good: 726 [702-740] × 10-6 mm2/s vs. poor: 663 [575-736] × 10-6 mm2/s; p = 0.01) and mean FA (0.30 ± 0.03 vs. 0.28 ± 0.03; p = 0.03). An exploratory prediction model combining clinical parameters, MD and FA increased the sensitivity for reliable prediction of

poor outcome from 60 to 85%, compared to the model containing clinical parameters only, but confidence intervals are overlapping. CONCLUSIONS: Free water-corrected MD and FA discriminate between patients with good and poor outcomes after cardiac arrest and hold the potential to add to multimodal outcome prediction. KEY POINTS: • Whole brain mean MD and FA differ between patients with good and poor outcome after cardiac arrest. • Free water-corrected MD can better discriminate between patients with good and poor outcome than uncorrected MD. • A combination of free water-corrected MD (sensitive to grey matter abnormalities) and FA (sensitive to white matter abnormalities) holds potential to add to the prediction of outcome.

2. J Cardiol. 2022 Nov 18:S0914-5087(22)00280-5. doi: 10.1016/j.jjcc.2022.11.009. Online ahead of print.

Association between blood urea nitrogen to creatinine ratio and neurologically Favourable outcomes in out-of-hospital cardiac arrest in adults: A multicentre cohort study.

Nishioka N(1), Kobayashi D(2), Izawa J(3), Irisawa T(4), Yamada T(5), Yoshiya K(6), Park C(7), Nishimura T(8), Ishibe T(9), Kobata H(10), Kiguchi T(11), Kishimoto M(12), Kim SH(13), Ito Y(14), Sogabe T(15), Morooka T(16), Sakamoto H(17), Suzuki K(18), Onoe A(19), Matsuyama T(20), Okada Y(1), Matsui S(21), Yoshimura S(1), Kimata S(1), Kawai S(1), Makino Y(1), Zha L(21), Kiyohara K(22), Kitamura T(21), Iwami T(23).

ABSTRACT

BACKGROUND: We aimed to investigate the association between blood urea nitrogen to creatinine ratio (BCR) and survival with favourable neurological outcomes in patients with out-of-hospital cardiac arrest (OHCA). METHODS: This prospective, multicentre, observational study conducted in Osaka, Japan enrolled consecutive OHCA patients transported to 16 participating institutions from 2012 through 2019. We included adult patients with non-traumatic OHCA who achieved a return of spontaneous circulation and whose blood urea nitrogen and creatinine levels on hospital arrival were available. Based on BCR values, they were divided into: 'low BCR' (BCR <10), 'normal BCR' (10 ≤ BCR <20), 'high BCR' (20 ≤ BCR <30), and 'very high BCR' (BCR ≥30). We evaluated the association between BCR values and neurologically favourable outcomes, defined as cerebral performance category score of 1 or 2 at one month after OHCA. RESULTS: Among 4415 eligible patients, the 'normal BCR' group had the highest favourable neurological outcome [19.4 % (461/2372)], followed by 'high BCR' [12.5 % (141/1127)], 'low BCR' [11.2 % (50/445)], and 'very high BCR' groups [6.6 % (31/471)]. In the multivariable analysis, adjusted odds ratios for 'low BCR', 'high BCR', and 'very high BCR' compared with 'normal BCR' for favourable neurological outcomes were 0.58 [95 % confidence interval (CI 0.37-0.91)], 0.70 (95 % CI 0.49-0.99), and 0.40 (95 % CI 0.21-0.76), respectively. Cubic spline analysis indicated that the association between BCR and favourable neurological outcomes was non-linear (p for non-linearity = 0.003). In subgroup analysis, there was an interaction between the aetiology of arrest and BCR in neurological outcome (p for interaction <0.001); favourable neurological outcome of cardiogenic OHCA patients was lower when the BCR was higher or lower, but not in non-cardiogenic OHCA patients. CONCLUSIONS: Both higher and lower BCR were associated with poor neurological outcomes compared to normal BCR, especially in cardiogenic OHCA patients.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. J Clin Med. 2022 Nov 20;11(22):6851. doi: 10.3390/jcm11226851.

The Impact of Prehospital and Hospital Care on Clinical Outcomes in Out-of-Hospital Cardiac Arrest.

Deri Y(1)(2), Berzon B(1)(2), West D(1)(2), Machloof M(2)(3), Strugo R(4), Kaplan T(4), Soffer S(2)(3).

ABSTRACT

Background: In recent years, several actions have been made to shorten the chain of survival in out-of-hospital cardiac arrest (OHCA). These include placing defibrillators in public places, training first responders, and providing dispatcher-assisted CPR (DA-CPR). In this work, we aimed to evaluate the impact of these changes on patients' outcomes, including achieving return of spontaneous circulation (ROSC), survival to discharge, and survival with favorable neurological function. Methods: We retrospectively retrieved data of all calls to the national emergency medical service in Ashdod city, Israel, of individuals who underwent OHCA at the age of 18 and older between the years 2018 and 2021. Data was collected on prehospital and hospital interventions. The association between pre-hospital and hospital interventions to ROSC, survival to discharge, and neurological outcomes was evaluated. Logistic regression was used for multivariable analysis. Results: During the years 2018-2021, there were 1253 OHCA cases in the city of Ashdod. ROSC was achieved in 207 cases (32%), survival to discharge was attained in 48 cases (7.4%), and survival with favorable neurological function was obtained in 26 cases (4%). Factors significantly associated with good prognosis were shockable rhythm, witnessed arrest, DA-CPR, use of AED, and treatment for STEMI. All patients that failed to achieve ROSC outside of the hospital setting had a poor prognosis. Conclusions: This study demonstrates the prognostic role of the initial rhythm and the use of AED in OHCA. Hospital management, including STEMI documentation and catheterization, was also an important prognostication factors. Additionally, when ROSC is not achieved in the field, hospital transfer should be considered.

2. Resusc Plus. 2022 Nov 17;12:100328. doi: 10.1016/j.resplu.2022.100328. eCollection 2022 Dec.

Prognosis of cardiac arrest in home care clients and nursing home residents: A population-level retrospective cohort study.

Mowbray FI(1), Jones A(1), Strum RP(1), Turcotte L(2)(3), Foroutan F(4), de Wit K(5), Worster A(5), Griffith LE(1)(6), Hebert P(2)(7), Heckman G(3)(8), Ko DT(9)(10), Schumacher C(11), Gayowsky A(9), Costa AP(1)(12).

ABSTRACT

AIM: To evaluate the prognosis of 30-day survival post-cardiac arrest among patients receiving home care and nursing home residents. METHODS: We conducted a population-level retrospective cohort study of community-dwelling adults (≥18 years) who received cardiac arrest care at a hospital in Ontario, Canada, between 2006 to 2018. We linked population-based health datasets using the Home Care Dataset to identify patients receiving home care and the Continuing Care Reporting System to identify nursing home residents. We included both out-of-hospital and in-hospital cardiac arrests. We determined unadjusted and adjusted associations using logistic regression after adjusting for age and sex. We converted relative measures to absolute risks. RESULTS: Our cohort contained 86,836 individuals. Most arrests (55.5 %) occurred out-of-hospital, with 9,316 patients enrolled in home care and 2,394 residing in a nursing home. When compared to those receiving no support services, the likelihood of survival to 30-days was lower for those receiving home care (RD = -6.5; 95 %CI = -7.5 - -5.0), with similar results found within sub-groups of out-of-hospital (RD = -6.7; 95 %CI = -7.6 - -5.7) and in-hospital arrests (RD = -8.7; 95 %CI = -10.6 - -7.3). The likelihood of 30-day survival was lower for nursing home residents (RD = -7.2; 95 %CI = -9.3 - -5.3) with similar results found within sub-groups of out-of-hospital (RD = -8.6; 95 %CI = -10.6 - -5.7) and in-hospital arrests

(RD = -5.0; 95 %CI = -7.8 - -2.1). CONCLUSION: Patients receiving home care and nursing home residents had worse overall prognoses of survival post-cardiac arrest compared to those receiving no pre-arrest support, highlighting two medically-complex groups likely to benefit from advance care planning.

3. Resusc Plus. 2022 Nov 17;12:100334. doi: 10.1016/j.resplu.2022.100334. eCollection 2022 Dec.
The impact of a high-performance cardiopulmonary resuscitation protocol on survival from out-of-hospital cardiac arrests witnessed by paramedics.
Alqudah Z(1)(2)(3), Smith K(1)(3)(4), Stephenson M(1)(3)(4), Walker T(1)(3)(5), Stub D(1)(4)(6)(7), Nehme Z(1)(3)(4).
ABSTRACT
AIM: In this study, we examine the effect of a high-performance cardiopulmonary resuscitation (HP-CPR) protocol on patient outcomes following out-of-hospital cardiac arrests (OHCA) witnessed by emergency medical services (EMS) personnel. METHODS: We performed a retrospective cohort study of adult, EMS witnessed OHCA patients of medical aetiology in Victoria, Australia. Patients treated after the introduction of a HP-CPR protocol and training programme between February 2019 and January 2020 were compared to historical controls between January 2015 and January 2019. The effect of a HP-CPR protocol on survival to hospital discharge was examined using logistic regression models adjusted for arrest factors. RESULTS: A total of 1,561 and 420 EMS witnessed OHCA patients were treated in the control and intervention periods, respectively. Baseline characteristics were mostly balanced across study periods, except for an initial arrest rhythm of asystole which was more frequent during the intervention period (20.2% vs 15.9%; p-value = 0.04). Unadjusted survival to hospital discharge was similar across control and intervention periods for the overall population (32.1% vs 29.4%, p-value = 0.27), but significantly higher during the intervention period for initial shockable arrests (76.9% vs 66.6%; p-value = 0.03). After adjustment for confounders, cases in the intervention period were associated with an improvement in the adjusted odds of survival to hospital discharge for overall arrests (adjusted odds ratio [AOR] 1.37, 95% CI: 1.00-1.88) and initial shockable arrests (AOR 1.70, 95% CI: 1.03-2.82). CONCLUSION: The implementation of a HP-CPR protocol was associated with a significant improvement in survival from EMS witnessed OHCA. Efforts to improve CPR performance could yield further improvements in patient outcomes.

4. Resuscitation. 2022 Nov 18:S0300-9572(22)00717-1. doi: 10.1016/j.resuscitation.2022.11.011. Online ahead of print.
Evaluating Novel Methods of Outcome Assessment following Cardiac Arrest.
Krampe N(1), Case N(1), Rittenberger JC(2), Condle JP(1), Doshi AA(1), Flickinger KL(1), Callaway C(1), Wallace D(3), Elmer J(4); University of Pittsburgh Post-Cardiac Arrest Service.
ABSTRACT
INTRODUCTION: We compared novel methods of long-term follow-up after resuscitation from cardiac arrest to a query of the National Death Index (NDI). We hypothesized use of the electronic health record (EHR), and internet-based sources would have high sensitivity for identifying decedents identified by the NDI. METHODS: We performed a retrospective study including patients treated after cardiac arrest at a single academic center from 2010 to 2018. We evaluated two novel methods to ascertain long-term survival and modified Rankin Scale (mRS): 1) a structured chart review of our health system's EHR; and 2) an internet-based search of: a) local newspapers, b) Ancestry.com, c) Facebook, d) Twitter, e) Instagram, and f) Google. If a patient was not reported deceased by any source, we considered them to be alive. We compared results of these novel

methods to the NDI to calculate sensitivity. We queried the NDI for 200 in-hospital decedents to evaluate sensitivity against a true criterion standard. RESULTS: We included 1,097 patients, 897 (82%) alive at discharge and 200 known decedents (18%). NDI identified 197/200 (99%) of known decedents. The EHR and local newspapers had highest sensitivity compared to the NDI (87% and 86% sensitivity, respectively). Online sources identified 10 likely decedents not identified by the NDI. Functional status estimated from EHR, and internet sources at follow up agreed in 38% of alive patients. CONCLUSIONS: Novel methods of outcome assessment are an alternative to NDI for determining patients' vital status. These methods are less reliable for estimating functional status.

5. Front Cardiovasc Med. 2022 Nov 4;9:1030843. doi: 10.3389/fcvm.2022.1030843. eCollection 2022.

Increased bystander intervention when volunteer responders attend out-of-hospital cardiac arrest.

Nielsen CG(1), Folke F(1)(2)(3), Andelius L(1)(4), Hansen CM(1)(5), Væggemose U(6)(7), Christensen EF(8)(9)(10), Torp-Pedersen C(11)(12), Ersbøll AK(1)(13), Gregers MCT(1)(2).

ABSTRACT

AIM: The primary aim was to investigate the association between alarm acceptance compared to no-acceptance by volunteer responders, bystander intervention, and survival in out-of-hospital cardiac arrest. MATERIALS AND METHODS: This retrospective observational study included all suspected out-of-hospital cardiac arrests (OHCAs) with activation of volunteer responders in the Capital Region of Denmark (1 November 2018 to 14 May 2019), the Central Denmark Region (1 November 2018 to 31 December 2020), and the Northern Denmark Region (14 February 2020 to 31 December 2020). All OHCAs unwitnessed by Emergency Medical Services (EMS) were analyzed on the basis on alarm acceptance and arrival before EMS. The primary outcomes were bystander cardio-pulmonary resuscitation (CPR), bystander defibrillation and secondary outcome was 30-day survival. A questionnaire sent to all volunteer responders was used with respect to their arrival status. RESULTS: We identified 1,877 OHCAs with volunteer responder activation eligible for inclusion and 1,725 (91.9%) of these had at least one volunteer responder accepting the alarm (accepted). Of these, 1,355 (79%) reported arrival status whereof 883 (65%) arrived before EMS. When volunteer responders accepted the alarm and arrived before EMS, we found increased proportions and adjusted odds ratio for bystander CPR {94 vs. 83%, 4.31 [95% CI (2.43-7.67)] and bystander defibrillation [13 vs. 9%, 3.16 (1.60-6.25)]} compared to cases where no volunteer responders accepted the alarm. CONCLUSION: We observed a fourfold increased odds ratio for bystander CPR and a threefold increased odds ratio for bystander defibrillation when volunteer responders accepted the alarm and arrived before EMS.

6. Resusc Plus. 2022 Nov 14;12:100330. doi: 10.1016/j.resplu.2022.100330. eCollection 2022 Dec.

Public attitudes towards bystander CPR and their association with social deprivation: Findings from a cross sectional study in North England.

Charlton K(1), Scott J(2), Blair L(1), Scott S(3), McClelland G(1), Davidson T(4), Burrow E(1), Mason A(1).

ABSTRACT

BACKGROUND: Bystander cardiopulmonary resuscitation (BCPR) is undertaken in only 40% of out of hospital cardiac arrests (OHCAs) in the UK. Lower rates of BCPR and public access defibrillator (PAD) use have been correlated with lower socio-economic status (SES). The aim of this study was to examine knowledge and attitudes towards BCPR and PAD's using a study specific questionnaire, and to understand how these potentially interact with individual characteristics and SES. METHODS: Cross-sectional study between July-December 2021 across areas of varying SES in North England.

RESULTS: Six hundred and one individuals completed the survey instrument (mean age = 51.9 years, 52.2 % female). Increased age was associated with being less willing to call 999 ($p < 0.001$) and follow call handler advice ($p < 0.001$). Female respondents were less comfortable performing BCPR than male respondents ($p = 0.006$). Individuals from least deprived areas were less likely to report comfort performing CPR, ($p = 0.016$) and less likely to know what a PAD is for, ($p = 0.025$). Higher education level was associated with increased ability to recognise OHCA ($p = 0.005$) and understanding of what a PAD is for ($p < 0.001$). Individuals with higher income were more likely to state they would follow advice regarding BCPR ($p = 0.017$) and report comfort using a PAD ($p = 0.029$). CONCLUSION: Individual characteristics such as age and ethnicity, rather than SES, are indicators of knowledge, willingness, and perceived competency to perform BCPR. Policy makers should avoid using SES alone to target interventions. Future research should examine how cultural identity and social cohesion intersect with these characteristics to influence willingness to perform BCPR.

7. J Cardiovasc Dev Dis. 2022 Nov 17;9(11):398. doi: 10.3390/jcdd9110398.
CPR Quality Assessment in Schoolchildren Training.
Oliveira KMG(1), Carmona MJC(1)(2), Mansur AP(1)(3), Takada JY(3), Fijačko N(4), Semeraro F(5), Lockey A(6), Böttiger BW(7), Nakagawa NK(1).
ABSTRACT
Whilst CPR training is widely recommended, quality of performance is infrequently explored. We evaluated whether a checklist can be an adequate tool for chest compression quality assessment in schoolchildren, compared with a real-time software. This observational study (March 2019-2020) included 104 schoolchildren with no previous CPR training (11-17 years old, 66 girls, 84 primary schoolchildren, 20 high schoolchildren). Simultaneous evaluations of CPR quality were performed using an observational checklist and real-time software. High-quality CPR was determined as a combination of 70% correct maneuvers in compression rate (100-120/min), depth (5-6 cm), and complete release, using a real-time software and three positive performance in skills using a checklist. We adjusted a multivariate logistic regression model for age, sex, and BMI. We found moderate to high agreement percentages in quality of CPR performance (rate: 68.3%, depth: 79.8%, and complete release: 91.3%) between a checklist and real-time software. Only 38.5% of schoolchildren (~14 years-old, ~54.4 kg, and ~22.1 kg/m2) showed high-quality CPR. High-quality CPR was more often performed by older schoolchildren (OR = 1.43, 95%IC:1.09-1.86), and sex was not an independent factor (OR = 1.26, 95%IC:0.52-3.07). For high-quality CPR in schoolchildren, a checklist showed moderate to high agreement with real-time software. Better performance was associated with age regardless of sex and BMI.

8. PeerJ. 2022 Nov 15;10:e14345. doi: 10.7717/peerj.14345. eCollection 2022.
Initial implementation of the resuscitation quality improvement program in emergency department of a teaching hospital in China.
Jiang H(#)(1), Zong L(#)(1), Li F(1), Gao J(1), Zhu H(1), Shi D(1), Liu J(1).
ABSTRACT
BACKGROUND: Cardiopulmonary resuscitation (CPR) skills may decay over time after conventional instructor-led BLS training. The Resuscitation Quality Improvement® (RQI®) program, unlike a conventional basic life support (BLS) course, is implemented through mastery learning and low-dose, high-frequency training strategies to improve CPR competence. We facilitated the RQI program to compare the performance of novices vs those with previous BLS training experience before RQI implementation and to obtain their confidence and attitude of the RQI program. METHODS: A single-center observational study was conducted from May 9, 2021 to June 25, 2021 in an emergency

department of a tertiary hospital. The performance assessment data of both trainees with a previous training experience in conventional BLS course (BLS group) and the novice ones with no prior experience with any BLS training (Non-BLS group) was collected by RQI cart and other outcome variables were rated by online questionnaire. Outcome measurements included chest compression and ventilation in both adult-sized and infant-sized manikins. RESULTS: A total of 149 participants were enrolled. Among them, 103 participants were in BLS group and 46 participants in Non-BLS group. Post RQI training, all the trainees achieved a passing score of 75 or more, and obtained an improvement in CPR performance. The number of attempts to pass RQI for compression and ventilation practice was lower in the BLS group in both adult and infant training sessions ($P < 0.05$). Although the BLS group had a poor baseline, it had fewer trials and the same learning outcomes, and the BLS group had better self-confidence. Trainees were well adapted to the innovative training modality, and satisfaction among all of the participants was high. Only the respondents for non-instructor led training, the satisfaction was low in both groups (72.8% in BLS group vs 65.2% in No-BLS group, strongly agreed). CONCLUSION: Among novices, RQI can provide excellent CPR core skills performance. But for those who had previous BLS training experience, it was able to enhance the efficiency of the skills training with less time consumption. Most trainees obtained good confidence and satisfaction with RQI program, which might be an option for the broad prevalence of BLS training in China.

9. Dimens Crit Care Nurs. 2023 Jan-Feb 01;42(1):22-32. doi: 10.1097/DCC.0000000000000557.
Cardiac Surgery Unit Advanced Life Support Training: A 10-Year Retrospective Study Examining Patient Mortality Outcomes After Implementation.
Whitlock JP(1).

ABSTRACT

BACKGROUND: Although the body of knowledge related to Cardiac Surgery Unit Advanced Life Support (CSU-ALS) guideline has grown over the last 10 years, there is no existing literature examining the impact of this training on patient mortality outcomes. OBJECTIVES: This article describes one institution's experience related to patient mortality outcomes following a rigorous training program following the CSU-ALS guideline. Because of the small numbers associated with cardiac arrests after cardiac surgery (0.7%-8%), statistical significance was not a goal. METHODS: A quasi-experimental design was used to compare mortality outcomes before and after CSU-ALS training. One hundred percent of the staff were trained in the initial year, and 85% to 90% of the staff maintained competency in the following years. The author used 10 years of retrospective data to compare mortality rates 4 years before and 6 years after the intervention. RESULTS: The retrospective data showed a decrease in the percentage of failure-to-rescue rate in the intervention group (control 16% vs intervention 2%). Fisher exact testing implies that the observed frequencies were not significantly different from the expected frequencies ($P = .072$ and $P = .135$). Because of the small sample size, statistical significance could not be established. DISCUSSION: This institution experienced an extremely positive track record in outcomes despite its inability to prove a statistically significant correlation to the CSU-ALS training. The overall observed and self-reported confidence level of the staff during the study period was outside the project scope but deserves mention and further research.

10. PLoS One. 2022 Nov 22;17(11):e0277992. doi: 10.1371/journal.pone.0277992. eCollection 2022.
Tele-Rapid Response Team (Tele-RRT): The effect of implementing patient safety network system on outcomes of medical patients-A before and after cohort study.
Balshi AN(1), Al-Odat MA(1), Alharthy AM(1), Alshaya RA(1), Alenzi HM(1)(2), Dambung AS(1)(2), Mhawish H(1)(2), Altamimi SM(1), Aletreby WT(1).

ABSTRACT
BACKGROUND: Rapid Response Teams were developed to provide interventions for deteriorating patients. Their activation depends on timely detection of deterioration. Automated calculation of warning scores may lead to early recognition, and improvement of RRT effectiveness. METHOD: This was a "Before" and "After" study, in the "Before" period ward nurses activated RRT after manually recording vital signs and calculating warning scores. In the "After" period, vital signs and warning calculations were automatically relayed to RRT through a wireless monitoring network. RESULTS: When compared to the before group, the after group had significantly lower incidence and rate of cardiopulmonary resuscitation (CPR) (2.3 / 1000 inpatient days versus 3.8 / 1000 inpatient days respectively, p = 0.01), significantly shorter length of hospital stay and lower hospital mortality, but significantly higher number of RRT activations. In multivariable logistic regression model, being in the "After" group decreases odds of CPR by 33% (OR = 0.67 [95% CI: 0.46-0.99]; p = 0.04). There was no difference between groups in ICU admission. CONCLUSION: Automated activation of the RRT significantly reduced CPR events and rates, improved CPR success rate, reduced hospital length of stay and mortality, but increased the number of RRT activations. There were no differences in unplanned ICU admission or readmission.

POST-CARDIAC ARREST TREATMENTS

No articles identified.

TARGETED TEMPERATURE MANAGEMENT

1. Crit Care. 2022 Nov 24;26(1):361. doi: 10.1186/s13054-022-04238-z.
Temperature control after cardiac arrest.
Sandroni C(1)(2)(3), Natalini D(4), Nolan JP(5)(6).
ABSTRACT
Most of the patients who die after cardiac arrest do so because of hypoxic-ischemic brain injury (HIBI). Experimental evidence shows that temperature control targeted at hypothermia mitigates HIBI. In 2002, one randomized trial and one quasi-randomized trial showed that temperature control targeted at 32-34 °C improved neurological outcome and mortality in patients who are comatose after cardiac arrest. However, following the publication of these trials, other studies have questioned the neuroprotective effects of hypothermia. In 2021, the largest study conducted so far on temperature control (the TTM-2 trial) including 1900 adults comatose after resuscitation showed no effect of temperature control targeted at 33 °C compared with normothermia or fever control. A systematic review of 32 trials published between 2001 and 2021 concluded that temperature control with a target of 32-34 °C compared with fever prevention did not result in an improvement in survival (RR 1.08; 95% CI 0.89-1.30) or favorable functional outcome (RR 1.21; 95% CI 0.91-1.61) at 90-180 days after resuscitation. There was substantial heterogeneity across the trials, and the certainty of the evidence was low. Based on these results, the International Liaison Committee on Resuscitation currently recommends monitoring core temperature and actively preventing fever (37.7 °C) for at least 72 h in patients who are comatose after resuscitation from cardiac arrest. Future studies are needed to identify potential patient subgroups who may benefit from temperature control aimed at hypothermia. There are no trials comparing normothermia or fever control with no temperature control after cardiac arrest.

2. Am J Emerg Med. 2022 Nov 12;64:1-7. doi: 10.1016/j.ajem.2022.11.002. Online ahead of print.

Recent developments and controversies in therapeutic hypothermia after cardiopulmonary resuscitation: A narrative review.

Li P(1), Sun Z(1), Tian T(1), Yu D(2), Tian H(3), Gong P(4).

ABSTRACT

Therapeutic hypothermia was recommended as the only neuroprotective treatment in comatose patients after return of spontaneous circulation (ROSC). With new evidence suggesting a similar neuroprotective effect of 36 °C and 33 °C, the term "therapeutic hypothermia" was substituted by "targeted temperature management" in 2011, which in turn was replaced by the term "temperature control" in 2022 because of new evidence of the similar effects of target normothermia and 33 °C. However, there is no clear consensus on the efficacy of therapeutic hypothermia. In this article, we provide an overview of the recent evidence from basic and clinical research related to therapeutic hypothermia and re-evaluate its application as a post-ROSC neuroprotective intervention in clinical settings.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. N Engl J Med. 2022 Nov 24;387(21):1995-1996. doi: 10.1056/NEJMe2213562. Epub 2022 Nov 6.

Defibrillation after Cardiac Arrest - Is It Time to Change Practice?

Sasson C(1), Haukoos J(1).

NO ABSTRACT AVAILABLE

PEDIATRICS AND CHILDREN

1. Children (Basel). 2022 Nov 16;9(11):1757. doi: 10.3390/children9111757.

Quality of Ventilations during Infant Resuscitation: A Simulation Study Comparing Endotracheal Tube with Face Mask.

Santos-Folgar M(1)(2)(3), Lafuente-Filgueira P(4), Otero-Agra M(1)(2), Fernández-Méndez F(1)(2)(5), Barcala-Furelos R(1)(5)(6), Trastoy-Quintela J(7), Aranda-García S(8), Fernández-Méndez M(1)(2)(5), Rodríguez-Núñez A(5)(7).

ABSTRACT

BACKGROUND: There are few studies that analyze ventilation volume and pressure during CPR carried out on infants. The aim of this study was to evaluate the quality of the ventilations administered using a self-inflating bag with an endotracheal tube and a face mask in manikins. METHODS: a quasi-experimental simulation study with a randomized case crossover design [endotracheal tube (ET) vs. face mask (FM)] was performed. Sixty participants who were previously trained nursing students participated in the study. The estimated air volumes breathed, and the pressure generated during each ventilation were assessed and the quality of the chest compressions was recorded. RESULTS: the ET test presented a higher percentage of ventilations that reached the lungs (100% vs. 86%; p < 0.001), with adequate volume (60% vs. 28%; p < 0.001) in comparison to FM. Both tests presented peak pressures generated in the airway greater than 30 cm H2O (ET: 22% vs. FM: 31%; p = 0.03). CONCLUSIONS: performing quality CPR ventilations on an infant model is not an easy skill for trained nursing students. Both tests presented a significant incidence of excessive peak pressure during ventilations. Specific training, focused on quality of ventilations guided by a manometer attached to the self-inflating bag, must be considered in life support training for pediatric providers.

EXTRACORPOREAL LIFE SUPPORT

1. Perfusion. 2022 Nov 23:2676591221141325. doi: 10.1177/02676591221141325. Online ahead of print.

Enabling the control of reperfusion parameters in out-of-hospital cardiac arrest: First applications of the CARL system.

Philipp A(1), Pooth JS(2)(3)(4), Benk C(2)(3)(4), Mueller T(5), Lunz D(6).

ABSTRACT

INTRODUCTION: There is increasing evidence for extracorporeal cardiopulmonary resuscitation (ECPR) as a rescue therapy for selected patients in refractory cardiac arrest (CA). Besides patient selection, the control of reperfusion parameters is of eminent importance. Especially in out-of-hospital CA, monitoring and individualized, targeted reperfusion remains a great challenge for emergency personnel. The CARL® system is designed to enable an early control of a variety of reperfusion parameters and to pursue a targeted reperfusion strategy in ECPR. CASE PRESENTATION: We report the first 10 ECPR applications of the CARL® system in Regensburg, Germany. Early blood gas analysis, oxygen titration and pressure monitoring were feasible and enabled an individualized and targeted reperfusion strategy in all patients. After suffering from refractory CA and prolonged resuscitation attempts, five out of the first 10 patients survived and were successfully discharged from the hospital (CPC one on hospital discharge). CONCLUSION: Application of the CARL® system contributed to early monitoring and control of reperfusion parameters. Whether targeted ECPR may have the potential to improve outcomes in refractory OHCA remains the subject of future investigations.

2. Crit Care Med. 2022 Dec 1;50(12):1768-1777. doi: 10.1097/CCM.0000000000005679. Epub 2022 Sep 30.

Low-Flow Duration and Outcomes of Extracorporeal Cardiopulmonary Resuscitation in Adults With In-Hospital Cardiac Arrest: A Nationwide Inpatient Database Study.

Ohbe H(1), Tagami T(1)(2), Ogura T(3), Matsui H(1), Yasunaga H(1).

ABSTRACT

OBJECTIVES: Although existing guidelines recommend commencing cannulation for extracorporeal cardiopulmonary resuscitation (ECPR) within 10-20 minutes of failed conventional resuscitation efforts for cardiac arrest, there is little supportive evidence. The present study aimed to determine the association of low-flow duration with survival-to-discharge rate in in-hospital cardiac arrest patients who received ECPR. DESIGN: A nationwide retrospective cohort study analyzed a nationwide inpatient database in Japan. Low-flow duration was defined as the time interval from initiation of chest compression to termination of chest compression. We assessed the association between low-flow duration and survival-to-discharge rate by predicting estimates with covariate adjustment stratified by categories of low-flow duration. SETTING: More than 1,600 acute-care hospitals in Japan. PATIENTS: All in-hospital cardiac arrest patients greater than or equal to 18 years old who received ECPR during hospitalization from July 2010 to March 2018. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Among 303,319 in-hospital cardiac arrest patients, 9,844 (3.2%) received ECPR in 697 hospitals during the study period and 9,433 were eligible in the study. The overall survival-to-discharge rate was 20.5% (1,932/9,433). The median low-flow duration was 26.0 minutes (interquartile range, 12.0-46.0 min) in the overall cohort. The highest and lowest estimated survival-to-discharge rates were 35.1% in the group with low-flow duration 0-5 minutes and 7.9% in the group with low-flow duration greater than 90 minutes. The estimated survival-to-discharge rate dropped sharply by about 20% during the first 35 minutes of low-flow duration (decreasing by about 3% every 5 min), followed by small decreases after the first 35 minutes. CONCLUSIONS: The estimated survival-to-discharge rate was markedly decreased by approximately 20% during the first 35 minutes of low-flow duration. Whether we should wait for the first 10-20 minutes of cardiac arrest without preparing for ECPR is questionable.

EXPERIMENTAL RESEARCH

1. Neurochem Res. 2022 Nov 24. doi: 10.1007/s11064-022-03824-5. Online ahead of print.
Therapeutic Hypothermia Combined with Hydrogen Sulfide Treatment Attenuated Early Blood-Brain Barrier Disruption and Brain Edema Induced by Cardiac Arrest and Resuscitation in Rat Model.
Cai S(1), Li Q(2), Fan J(1), Zhong H(1), Cao L(1), Duan M(3).
ABSTRACT
Brain injury remains a major problem in patients suffering cardiac arrest (CA). Disruption of the blood-brain barrier (BBB) is an important factor leading to brain injury. Therapeutic hypothermia is widely accepted to limit neurological impairment. However, the efficacy is incomplete. Hydrogen sulfide (H2S), a signaling gas molecule, has protective effects after cerebral ischemia reperfusion injury. This study showed that combination of hypothermia and H2S after resuscitation was more beneficial for attenuated BBB disruption and brain edema than that of hypothermia or H2S treatment alone. CA was induced by ventricular fibrillation for 4 min. Hypothermia was performed by applying alcohol and ice bags to the body surface under anesthesia. We used sodium hydrosulphide (NaHS) as the H2S donor. We found that global brain ischemia induced by CA and cardiopulmonary resuscitation (CPR) resulted in brain edema and BBB disruption; Hypothermia or H2S treatment diminished brain edema, decreased the permeability and preserved the structure of BBB during the early period of CA and resuscitation, and more importantly, improved the neurologic function, increased the 7-day survival rate after resuscitation; the combination of hypothermia and H2S treatment was more beneficial than that of hypothermia or H2S treatment alone. The beneficial effects were associated with the inhibition of matrix metalloproteinase-9 expression, attenuated the degradation of the tight junction protein occludin, and subsequently protected the structure of BBB. These findings suggest that combined use of therapeutic hypothermia and hydrogen sulfide treatment during resuscitation of CA patients could be a potential strategy to improve clinical outcomes and survival rate.

2. Shock. 2022 Nov 28. doi: 10.1097/SHK.0000000000002058. Online ahead of print.
Baicalein Relieves Brain Injury via Inhibiting Ferroptosis and Endoplasmic Reticulum Stress in a Rat Model of Cardiac Arrest.
Ye Z, Zhang F(1), Wang P, Ran Y(1), Liu C(1), Lu J(1), Zhang M(1), Yao L(1).
ABSTRACT
BACKGROUND: Cardiac arrest (CA) is one of the leading causes of death worldwide. Endoplasmic reticulum (ER) stress and ferroptosis are proven pathological mechanisms implicated in neuronal damage. Baicalein, a ferroptosis Inhibitor, improved outcomes after traumatic brain injury. We aimed to explore the effects of baicalein on brain injury via ferroptosis and ER stress in a rat model of CA. METHODS: Cardiac arrest models were established in Sprague-Dawley (SD) rats. The sham group (n = 6) was untreated with inducing ventricular fibrillation to cardiac arrest and cardio-pulmonary resuscitation (CPR). Survival rats were randomly divided into five groups (n = 6). Ferroptosis inhibitor and ER stress agonist were administered separately and together in three groups. There was no drug intervention in the remaining group. The neurological deficit scores were recorded. Characteristics of ferroptosis were observed. And the associated protein of ferroptosis and ER stress were determined by western blot. Cerebral ROS production was measured by using 2',7'-dichlorofluorescein diacetate as the oxidative fluorescent probe. RESULTS: Baicalein treatment improved neurological outcomes and decreased neurocyte injuries compared with CPR group. The changes of ferroptosis, more specifically, iron content, glutathione peroxidase 4 (GPX4), reactive oxygen species (ROS), arachidonate 15-lipoxygenase (ALOX15) and mitochondrial characteristics,

were observed in brain tissue after ROSC. ALOX15 was lower in Baicalein group than in CPR group. The morphology and structure of mitochondria in Baicalein group were better than in CPR group. The ER stress markers, glucose-regulated protein 78, activating Transcription Factor 4 and C/EBP homologous protein was lower in Baicalein group compared with CPR group. ROS in Tunicamycin group was higher than in CPR group. And ROS in Baicalein +Tunicamycin group was lower than in Tunicamycin group. CONCLUSION: Ferroptosis and ER stress are both involved in brain injury after ROSC. Baicalein alleviates brain injury via suppressing the ferroptosis and ER stress, and reduces ROS partly through inhibiting ER stress. Baicalein is a potential drug to relieve brain injury after ROSC.

3. Biomed Pharmacother. 2022 Dec;156:113847. doi: 10.1016/j.biopha.2022.113847. Epub 2022 Oct 14.

The monoacylglycerol lipase inhibitor, JZL184, has comparable effects to therapeutic hypothermia, attenuating global cerebral injury in a rat model of cardiac arrest.

Xu J(1), Zheng G(2), Hu J(3), Ge W(3), Bradley JL(3), Ornato JP(4), Tang W(5).

ABSTRACT

Post-resuscitation cerebral ischemia-reperfusion injury (IRI) is a vital contributor to poor neurological prognosis. Exploring novel therapeutics that attenuate cerebral IRI is of great significance. Inflammation plays a role in the development of cerebral IRI after successful cardiopulmonary resuscitation (CPR). Monoacylglycerol lipase (MAGL) is an enzyme that is predominantly responsible for the metabolism of endocannabinoid 2-arachidonoylglycerol (2-AG) to arachidonic acid (AA) metabolites, which are associated with inflammation. Therefore, we investigated the efficacy of the MAGL inhibitor, JZL184, on cerebral IRI and further compared the effects to therapeutic hypothermia (TH). Thirty-six rats were randomized into three groups: 1) JZL184; 2) Control; 3) TH (N = 12 for each group). Animals underwent 6 min of ventricular fibrillation (VF) followed with 8 min of CPR. After return of spontaneous circulation (ROSC), rats received an intraperitoneal injection of JZL184 (16 mg/kg) or DMSO (20 mg/ml) or body cooling was initiated. Cerebral microcirculation, brain edema, blood brain barrier (BBB) permeability, serum neuron-specific enolase (NSE), S-100β, interleukin-6 (IL-6) and interleukin-10 (IL-10) were quantified at 6 h post ROSC. Compared to control, treatment with JZL184 or TH was associated with significantly ameliorated cerebral microcirculation, mitigated brain edema, attenuated BBB permeability, decreased serum levels of NSE, S-100β and IL-6, and increased serum IL-10 levels ($p < 0.05$). There was no significant difference in the above measurements between JZL184 and TH. JZL184 has comparable neuroprotective effects to therapeutic hypothermia on global cerebral IRI in a rat model of cardiac arrest (CA).

4. Anesthesiology. 2022 Dec 1;137(6):716-732. doi: 10.1097/ALN.0000000000004390.

Post-cardiac arrest Sedation Promotes Electroencephalographic Slow-wave Activity and Improves Survival in a Mouse Model of Cardiac Arrest.

Ikeda T(1), Amorim E(2), Miyazaki Y(1), Kato R(3), Marutani E(1), Silverman MG(4), Malhotra R(4), Solt K(5), Ichinose F(1).

ABSTRACT

BACKGROUND: Patients resuscitated from cardiac arrest are routinely sedated during targeted temperature management, while the effects of sedation on cerebral physiology and outcomes after cardiac arrest remain to be determined. The authors hypothesized that sedation would improve survival and neurologic outcomes in mice after cardiac arrest. METHODS: Adult C57BL/6J mice of both sexes were subjected to potassium chloride-induced cardiac arrest and cardiopulmonary resuscitation. Starting at the return of spontaneous circulation or at 60 min after return of spontaneous circulation, mice received intravenous infusion of propofol at 40 mg · kg-1 · h-1, dexmedetomidine at 1 μg · kg-1 · h-1, or normal saline for 2 h. Body temperature was lowered and

maintained at 33°C during sedation. Cerebral blood flow was measured for 4 h postresuscitation. Telemetric electroencephalogram (EEG) was recorded in freely moving mice from 3 days before up to 7 days after cardiac arrest. RESULTS: Sedation with propofol or dexmedetomidine starting at return of spontaneous circulation improved survival in hypothermia-treated mice (propofol [13 of 16, 81%] vs. no sedation [4 of 16, 25%], P = 0.008; dexmedetomidine [14 of 16, 88%] vs. no sedation [4 of 16, 25%], P = 0.002). Mice receiving no sedation exhibited cerebral hyperemia immediately after resuscitation and EEG power remained less than 30% of the baseline in the first 6 h postresuscitation. Administration of propofol or dexmedetomidine starting at return of spontaneous circulation attenuated cerebral hyperemia and increased EEG slow oscillation power during and early after sedation (40 to 80% of the baseline). In contrast, delayed sedation failed to improve outcomes, without attenuating cerebral hyperemia and inducing slow-wave activity. CONCLUSIONS: Early administration of sedation with propofol or dexmedetomidine improved survival and neurologic outcomes in mice resuscitated from cardiac arrest and treated with hypothermia. The beneficial effects of sedation were accompanied by attenuation of the cerebral hyperemic response and enhancement of electroencephalographic slow-wave activity.

5. Resusc Plus. 2022 Nov 14;12:100326. doi: 10.1016/j.resplu.2022.100326. eCollection 2022 Dec.
Left ventricle chest compression improves ETCO(2), blood pressure, and cerebral blood velocity in a swine model of cardiac arrest and cardiopulmonary resuscitation.
Marshall RA(1)(2)(3), Morton JS(1), Luchkanych AMS(1)(4), El Karsh Y(1), El Karsh Z(1), Morse C(1), Tomczak CR(4), Grunau BE(5), Olver TD(1).
ABSTRACT
INTRODUCTION: During cardiopulmonary resuscitation (CPR), high quality chest compressions are critical to organ perfusion, especially the brain. Yet, the optimal location for chest compressions is unclear. It was hypothesized that compared with the standard chest compression (SCC) location, left ventricle chest compressions (LVCCs) would result in greater ETCO2, blood pressure (BP), and cerebral blood velocity (CBV) during CPR in swine. METHODS: Female Landrace swine (N = 32; 35 ± 2 kg) underwent two mins of untreated asphyxiated cardiac arrest (CA). Thereafter, swine were treated with three 2-min cycles of either SCC or LVCC mechanical basic life support CPR (LUCAS 3). ETCO2 (in-line sampling), BP (arterial catheter line), and CBV (transcranial Doppler) were measured during the pre-CA, untreated-CA, and CPR-treated phases. RESULTS: ETCO2, BP, and CBV were similar between groups at pre- and during untreated-CA (P ≥ 0.188). During CPR, ETCO2 (36 ± 6 versus 24 ± 10 mmHg, P < 0.001), mean arterial BP (MAP; 49 ± 9 versus 37 ± 9 mmHg, P = 0.002), and CBV (11 ± 5 versus 5 ± 2 cm/s, P < 0.001) were significantly greater in the LVCC versus SCC group. Moreover, a greater proportion of animals obtained targets for ETCO2 (ETCO2 ≥ 20 mmHg; 52 % (17/33) versus 100 % (32/32), P < 0.001) and diastolic BP (DBP ≥ 25 mmHg; 82 % (33/40) versus 97 % (48/49), P = 0.020) in the LVCC versus SCC group. CONCLUSION: Indicators of cardiac output, BP, and cerebral perfusion during CPR were greatest in the LVCC group, suggesting the quality of chest compressions during BLS CPR may be improved by performing compressions over the left ventricle compared to the centre of the chest.

CASE REPORTS

1. Inn Med (Heidelb). 2022 Nov 23. doi: 10.1007/s00108-022-01434-5. Online ahead of print.
[Hypertriglyceridemic pancreatitis and cardiac tamponade in a 26-year-old woman].
[Article in German; Abstract available in German from the publisher]
Kozlov A(1), Becher MU(2), Schlecker S(2).
ABSTRACT

A 26-year-old woman with type 2 diabetes mellitus and discontinued intensive conventional insulin therapy was admitted to the authors' hospital with acute upper abdominal pain. Severe hypertriglyceridemia and acute pancreatitis were diagnosed. Treatment included insulin administration and plasmapheresis. On day 3, the patient developed sudden haemodynamic instability and in-hospital cardiopulmonary arrest. Focused echocardiography showed pericardial effusion with right ventricular collapse. Pericardiocentesis was performed, leading to a return of spontaneous circulation.

2. Am J Case Rep. 2022 Nov 22;23:e938127. doi: 10.12659/AJCR.938127.
Case Report of Multisystem Inflammatory Syndrome in Adults (MIS-A): A 31-Year-Old Man with Fever, Rash, and Cardiac Symptoms 6 Weeks Following SARS-CoV-2 Infection, Successfully Resuscitated Following Cardiac Arrest.
Gerstner G(1), Rafalski TA(2), Pankiewicz D(3).
ABSTRACT
BACKGROUND Multisystem inflammatory syndrome in adults (MIS-A) is an uncommon condition after a confirmed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, manifesting as multiorgan failure despite apparent resolution of initial symptoms. While this syndrome shares similar characteristics with a syndrome found in children, fewer cases are reported in adults. This report details a 31-year-old man fulfilling the diagnostic criteria of MIS-A, who was successfully resuscitated following cardiac arrest. CASE REPORT A 31-year-old man was admitted to the intensive care unit for 3 days of progressively worsening fever, chills, diaphoresis, exanthematous rash, headache, and neck stiffness. The patient had a history of mild, resolved SARS-CoV-2 infection 6 weeks prior to his presentation, diagnosed by rapid antigen and reverse transcription polymerase chain reaction (RT-PCR) testing. Meningitis and autoimmune pathologies were initially suspected but were ruled out. Given the patient's symptoms, prior SARS-CoV-2 infection, and positive inflammatory markers, findings correlated with the Centers for Disease Control and Prevention's diagnostic criteria for multisystem inflammatory syndrome in adults. On hospital day 1, the patient decompensated into severe respiratory distress requiring intubation. Shortly after, the patient developed cardiac arrest and was successfully resuscitated. He was transferred from our rural hospital to an intensive care unit at a facility with additional resources. He remained critically ill for several weeks while receiving high-dose steroids, intravenous immuno-globulin (IVIG), and hemodialysis until his recovery. CONCLUSIONS Early diagnosis and treatment of MIS-A would significantly improve outcomes in this subset of patients, especially in clinical settings with limited resources.

3. Front Cardiovasc Med. 2022 Nov 4;9:1045601. doi: 10.3389/fcvm.2022.1045601. eCollection 2022.
Case report: Refractory cardiac arrest supported with veno-arterial-venous extracorporeal membrane oxygenation and left-ventricular Impella CP(®)-Physiological insights and pitfalls of ECMELLA.
Thevathasan T(1)(2)(3)(4), Füreder L(1), Donker DW(5)(6), Nix C(7), Wurster TH(1)(2), Knie W(1), Girke G(1), Al Harbi AS(1), Landmesser U(1)(2)(3), Skurk C(1)(3).
ABSTRACT
INTRODUCTION: To the best of our knowledge, this is the first case report which provides insights into patient-specific hemodynamics during veno-arterio-venous-extracorporeal membrane oxygenation (VAV ECMO) combined with a left-ventricular (LV) Impella® micro-axial pump for therapy-refractory cardiac arrest due to acute myocardial infarction, complicated by acute lung injury (ALI). PATIENT PRESENTATION: A 54-year-old male patient presented with ST-segment

elevation acute coronary syndrome complicated by out-of-hospital cardiac arrest with ventricular fibrillation upon arrival of the emergency medical service. As cardiac arrest was refractory to advanced cardiac life support, the patient was transferred to the Cardiac Arrest Center for immediate initiation of extracorporeal cardiopulmonary resuscitation (ECPR) with peripheral VA ECMO and emergency percutaneous coronary intervention using drug eluting stents in the right coronary artery. Due to LV distension and persistent asystole after coronary revascularization, an Impella® pump was inserted for LV unloading and additional hemodynamic support (i.e.,"ECMELLA"). Despite successful unloading by ECMELLA, post-cardiac arrest treatment was further complicated by sudden differential hypoxemia of the upper body. This so called "Harlequin phenomenon" was explained by a new onset of ALI, necessitating escalation of VA ECMO to VAV ECMO, while maintaining Impella® support. Comprehensive monitoring as derived from the Impella® console allowed to illustrate patient-specific hemodynamics of cardiac unloading. Ultimately, the patient recovered and was discharged from the hospital 28 days after admission. 12 months after the index event the patient was enrolled in the ECPR Outpatient Care Program which revealed good recovery of neurologic functions while physical exercise capacities were impaired. CONCLUSION: A combined mechanical circulatory support strategy may successfully be deployed in complex cases of severe cardio-circulatory and respiratory failure as occasionally encountered in clinical practice. While appreciating potential clinical benefits, it seems of utmost importance to closely monitor the physiological effects and related complications of such a multimodal approach to reach the most favorable outcome as illustrated in this case.

4. World J Clin Cases. 2022 Nov 16;10(32):11861-11868. doi: 10.12998/wjcc.v10.i32.11861.
Survival of a patient who received extracorporeal membrane oxygenation due to postoperative myocardial infarction: A case report.
Wang QQ(1), Jiang Y(2), Zhu JG(1), Zhang LW(1), Tong HJ(3), Shen P(4).
ABSTRACT
BACKGROUND: Cardiac arrest after noncardiac surgery is a dangerous complication that may contribute to mortality. Because of the high mortality rate and many complications of cardiac arrest, it is very important to identify and correct a reversible etiology early. By reporting the treatment process of this case, we aimed to broaden the diagnosis and treatment of cardiac arrest after noncardiac surgery and describe how cardiopulmonary resuscitation using extracorporeal membrane oxygenation (ECMO) can improve a patient's chance of survival. CASE SUMMARY: A 69-year-old man visited our hospital complaining of low back pain on July 12, 2021. Magnetic resonance imaging showed lumbar disc herniation. Two hours after lumbar disc herniation surgery, the patient developed cardiac arrest. Cardiopulmonary resuscitation was performed, and ECMO was started 60 min after the initiation of cardiopulmonary resuscitation. Regarding the etiology of early cardiac arrest after surgery, acute myocardial infarction and pulmonary embolism were considered first. Based on ultrasound evaluation, acute myocardial infarction appeared more likely. Coronary angiography confirmed occlusion of the left anterior descending branch, and coronary artery stenting was performed. Pulmonary artery angiography was performed to exclude pulmonary embolism. Due to heparinization during ECMO and coronary angiography, there was a large amount of oozing blood in the surgical incision. Therefore, heparin-free ECMO was performed in the early stage, and routine heparinized ECMO was performed after hemorrhage stabilization. Eventually, the patient was discharged and made a full neurologic recovery. CONCLUSION: For early postoperative cardiac arrest, acute myocardial infarction should be considered first, and heparin should be used with caution.

5. Ann Emerg Med. 2022 Dec;80(6):568-578. doi: 10.1016/j.annemergmed.2022.06.009.

Man With Cardiac Arrest.

Ho H(1), Yang CX(1), Hsieh FC(2), Chu SE(1), Huang CY(1), Chiang WC(3), Ma MHM(3), Tsai KC(1), Sun JT(1).

NO ABSTRACT AVAILABLE