This week's PubMed 2nd – 8th October 2022: articles of interest n = 58

CPR AND COVID-19

1. JAMA Netw Open. 2022 Oct 3;5(10):e2235401. doi: 10.1001/jamanetworkopen.2022.35401.
Association of the COVID-19 Pandemic With Prehospital Characteristics and Outcomes of Pediatric Patients With Out-of-Hospital Cardiac Arrest in Japan, 2005-2020.
Zha L(1), Hosomi S(2), Kiyohara K(3), Sobue T(1), Kitamura T(1).
ABSTRACT
Plain Language Summary: This cohort study investigates the association of the COVID-19 pandemic with prehospital characteristics and outcomes of pediatric patients with out-of-hospital-cardiac arrest in Japan.

2. J Obstet Gynaecol. 2022 Oct 4:1-5. doi: 10.1080/01443615.2022.2126298. Online ahead of print.
Perimortem caesarean section in COVID-19 era.
Saroyo YB(1), Wibowo N(1), Prasmusinto D(1), Purwosunu Y(1), Irwinda R(1), Dilmy MAF(1), Putri A(2), Wijaya A(2).
ABSTRACT
Cardiac arrest in pregnancy is very rare. Various methods have been proposed to return spontaneous circulation and prevent mortality, such as Perimortem Caesarean Section (PMCS). Since 2019, the COVID-19 pandemic has added to the difficulty in decision making and performing PMCS. Infection prevention being a priority due to the rapid spreading of the virus could cause hesitation upon initiating an emergency procedure, especially PMCS. We have reviewed the issues impacting on basic and advanced life support in adults with suspected or confirmed COVID-19.

3. Cardiol J. 2022;29(5):886-887. doi: 10.5603/CJ.a2022.0070. Epub 2022 Aug 1.
Cardiac arrest outcomes in the COVID-19 era.
Salajegheh Tazerji S(1)(2), Navolokina A(3), Karbowska E(4), Shahabinejad F(5).
NO ABSTRACT AVAILABLE

4. Resuscitation. 2022 Oct;179:29-35. doi: 10.1016/j.resuscitation.2022.07.040. Epub 2022 Aug 3.
Racial/ethnic and gender disparities of the impact of the COVID-19 pandemic in out-of-hospital cardiac arrest (OHCA) in Texas.
Chavez S(1), Huebinger R(2), Chan HK(2), Schulz K(2), Panczyk M(2), Villa N(2), Johnson R(2), Greenberg R(3), Vithalani V(4), Al-Araji R(5), Bobrow B(2).
ABSTRACT
INTRODUCTION: Prior research shows a greater disease burden, lower BCPR rates, and worse outcomes in Black and Hispanic patients after OHCA. Female OHCA patients have lower rates of BCPR compared to men and other survival outcomes vary. The influence of the COVID-19 pandemic on OHCA incidence and outcomes in different health disparity populations is unknown. METHODS: We used data from the Texas Cardiac Arrest Registry to Enhance Survival (CARES). We determined the association of both prehospital characteristics and survival outcomes with the pandemic period in each study group through Pearson's $\chi 2$ test or Fisher's exact tests. We created mixed multivariable logistic regression models to compare odds of cardiac arrest care and outcomes between 2019 and 2020 for the study groups. RESULTS: Black OHCA patients (aOR = 0.73; 95% CI: 0.65 - 0.82) had significantly lower odds of BCPR compared to White OHCA patients, were less likely to achieve ROSC (aOR = 0.86; 95% CI: 0.74 - 0.99) or have a good CPC score (aOR = 0.47; 95% CI: 0.29 - 0.75). Compared to White patients with OHCA, Hispanic persons were less likely to have a field TOR

(aOR = 0.86; 95% CI: 0.75 - 0.99) or receive BCPR (aOR = 0.78; 95% CI: 0.69 - 0.87). Female OHCA patients had higher odds of surviving to hospital admission compared to males (aOR = 1.29; 95% CI: 1.15 - 1.44). CONCLUSION: Many OHCA outcomes worsened for Black and Hispanic patients. While some aspects of care worsened for women, their odds of survival improved compared to males.

CPR/MECHANICAL CHEST COMPRESSION

1. Resusc Plus. 2022 Sep 29;12:100311. doi: 10.1016/j.resplu.2022.100311. eCollection 2022 Dec.
Suction cup on a piston-based chest compression device improves coronary perfusion pressure and cerebral oxygenation during experimental cardiopulmonary resuscitation.
Mälberg J(1)(2), Smekal D(1)(2), Marchesi S(3), Lipcsey M(2)(4), Rubertsson S(2).
ABSTRACT
INTRODUCTION: The presented study aimed to investigate whether a mechanical chest compression piston device with a suction cup assisting chest recoil could impact the hemodynamic status when compared to a bare piston during cardiopulmonary resuscitation. METHODS: 16 piglets were anesthetized and randomized into 2 groups. After 3 minutes of induced ventricular fibrillation, a LUCAS 3 device was used to perform chest compressions, in one group a suction cup was mounted on the device's piston, while in the other group, compressions were performed by the bare piston. The device was used in 30:2 mode and the animals were manually ventilated. Endpoints of the study were: end tidal carbon dioxide, coronary and cerebral perfusion pressures, and brain oxygenation (measured using near infrared spectroscopy). At the end of the protocol, the animals that got a return to spontaneous circulation were observed for 60 minutes, then euthanized. RESULTS: No difference was found in end tidal carbon dioxide or tidal volumes. Coronary perfusion pressure and cerebral oxygenation were higher in the Suction cup group over the entire experiment time, while cerebral perfusion pressure was higher only in the last 5 minutes of CPR. A passive tidal volume (air going in and out the airways during compressions) was detected and found correlated to end tidal carbon dioxide. CONCLUSIONS: The use of a suction cup on a piston-based chest compression device did not increase end tidal carbon dioxide, but it was associated to a higher coronary perfusion pressure.

2. Resuscitation. 2022 Oct;179:25-26. doi: 10.1016/j.resuscitation.2022.07.025. Epub 2022 Jul 27.
Mechanical chest compression: Special devices for special situations - As simple as that?
Scholz SS(1), Thies KC(2).
NO ABSTRACT AVAILABLE

REGISTRIES, REVIEWS AND EDITORIALS

1. Circ Cardiovasc Qual Outcomes. 2022 Oct 4:101161CIRCOUTCOMES122009042. doi: 10.1161/CIRCOUTCOMES.122.009042. Online ahead of print.
Long-Term Outcomes for Out-of-Hospital Cardiac Arrest in Elderly Patients: An Analysis of Cardiac Arrest Registry to Enhance Survival Data Linked to Medicare Files.
Chan PS(1), McNally B(2)(3), Chang A(4), Girotra S(5), Al-Araji R(3), Mawani M(6), Ahn KO(7), Merritt R(4).
ABSTRACT
BACKGROUND: Most studies on out-of-hospital cardiac arrest have primarily focused on in-hospital or short-term survival. Little is known about long-term outcomes and resource use among survivors of out-of-hospital cardiac arrest. METHODS: In this observationsl study, we describe overall long-

term outcomes for patients from the national Cardiac Arrest Registry to Enhance Survival linked to Medicare files to create the Cardiac Arrest Registry to Enhance Survival: Mortality, Events, and Costs for Cardiac Arrest survivors dataset. Cardiac Arrest Registry to Enhance Survival data between 2013 and 2019 were linked to Medicare data using probabilistic matching algorithms. Overall long-term mortality, readmissions, and index hospitalization costs are reported for the overall cohort. RESULTS: Among 56 425 patients who were 65 years of age or older in Cardiac Arrest Registry to Enhance Survival who survived to hospital admission, 26 875 (47.6%) were successfully linked to Medicare files. Mean (+SD) cost of the index hospitalization was $23 262+$24 199 and the median cost was $14 636 (interquartile range, $9930-$30 033). Overall, 8676 (32.3%) survived to hospital discharge with 38.0% discharged home, 11.8% to hospice care, and the remaining 50.2% to other inpatient, skilled nursing care, or rehabilitation facilities. Mortality after discharge was initially high (27.0% at 3 months) and then increased gradually, with 1- and 3-year mortality of 37.1% and 50.1%, respectively. During the first year, 40.1% were readmitted at least once, with 19.7% readmitted on > 1 occasion. CONCLUSIONS: The Cardiac Arrest Registry to Enhance Survival: Mortality, Events, and Costs for Cardiac Arrest survivors registry includes rich data on postdischarge outcomes and resource utilization. Use of this dataset will enable future investigations on the long-term effectiveness, costs, and cost-effectiveness of various interventions for out-of-hospital cardiac arrest in elderly patients.

2. Am J Cardiol. 2022 Sep 30:S0002-9149(22)00910-9. doi: 10.1016/j.amjcard.2022.08.028. Online ahead of print.

Prediction of Sudden Cardiac Arrest After Alcohol Septal Ablation for Hypertrophic Obstructive Cardiomyopathy: ASA-SCARRE Risk Score.

Veselka J(1), Liebregts M(2), Cooper R(3), Faber L(4), Januska J(5), Kashtanov M(6), Tesarkova KH(7), Hansen PR(8), Seggewiss H(9), Shloydo E(10), Popov K(10), Hansvenclova E(11), Polakova E(11), Ten Berg J(2), Stables RH(3), Jarkovsky J(12), Bonaventura J(11).

ABSTRACT

This study aimed to derive a new score, the Alcohol Septal Ablation-Sudden Cardiac ARREst (ASA-SCARRE) risk score, that can be easily used to evaluate the risk of sudden cardiac arrest events (sudden cardiac death, resuscitation, or appropriate implantable cardioverter-defibrillator discharge) after alcohol septal ablation (ASA) in patients with hypertrophic obstructive cardiomyopathy. We analyzed 1,834 patients from the Euro-ASA registry (49% men, mean age 57 ± 14 years) who were followed up for 5.0 ± 4.3 years (9,202 patient-years) after ASA. A total of 65 patients (3.5%) experienced sudden cardiac arrest events, translating to 0.72 events per 100 patient-years. The independent predictors of sudden cardiac arrest events were septum thickness before ASA (hazard ratio 1.09 per 1 mm, 95% confidence interval 1.04 to 1.14, p <0.001) and left ventricular outflow tract (LVOT) gradient at the last clinical checkup (hazard ratio 1.01 per 1 mm Hg, 95% confidence interval 1.01 to 1.02, p = 0.002). The following ASA-SCARRE risk scores were derived and independently predicted long-term risk of sudden cardiac arrest events: "0" for both LVOT gradient <30 mmHg and baseline septum thickness <20 mm; "1" for LVOT gradient ≥30 mm Hg or baseline septum thickness ≥20 mm; and "2" for both LVOT gradient ≥30 mm Hg and baseline septum thickness ≥20 mm. The C statistic of the ASA-SCARRE risk score was 0.684 (SE 0.030). In conclusion, the ASA-SCARRE risk score may be a useful and easily available clinical tool to predict risk of sudden cardiac arrest events after ASA in patients with hypertrophic obstructive cardiomyopathy.

3. Resuscitation. 2022 Sep 19;180:52-58. doi: 10.1016/j.resuscitation.2022.09.009. Online ahead of print.

Epidemiology and clinical outcomes of poisoning-induced cardiac arrest in Japan: Retrospective analysis of a nationwide registry.

Chiba T(1), Otaka S(2), Igeta R(2), Burns MM(3), Ikeda S(4), Shiga T(2).

ABSTRACT

BACKGROUND: Poisoning is an important cause of out-of-hospital cardiac arrest which can be challenging to manage. Neurological outcomes after poisoning-induced out-of-hospital cardiac arrest (POHCA) are yet to be fully elucidated. This retrospective cohort study sought to describe the characteristics of POHCA, and identify factors associated with favourable neurologic outcomes. METHODS: Cardiac arrests recorded in the "All Japan Utstein Registry" from 1 January 2012 to 31 December 2017 were included. A descriptive analysis of the characteristics of POHCA and non-POHCA patients was performed. Neurological outcomes were compared between the POHCA and non-POHCA groups using logistic regression analysis. Subgroup analysis was performed for patients who underwent prolonged resuscitation. RESULTS: Compared to non-POHCA patients (n = 665,262), POHCA patients (n = 1,868) were younger (median age, 80 vs 51 years) and had a lower likelihood of having a witness, bystander cardiopulmonary resuscitation, and an initial shockable rhythm. Multivariable logistic regression analysis showed that POHCA was associated with favourable neurologic outcomes (odds ratio 1.54, 95 % confidence interval 1.19-2.01, p = 0.001). Among patients who received > 30 min of resuscitation, neurologic outcomes were similar in those with POHCA and non-POHCA (favourable neurologic outcome, 1.03 % vs 0.98 %, p = 0.87). CONCLUSIONS: POHCA is associated with favourable neurological outcomes and requires aggressive resuscitation. However, in patients who required prolonged resuscitation, the outcomes of POHCA were not different from those of non-POHCA. The decision to perform prolonged resuscitation should be guided on a case-by-case basis based on a range of factors.

4. CNS Neurosci Ther. 2022 Oct 2. doi: 10.1111/cns.13983. Online ahead of print.

The use of ketamine as a neuroprotective agent following cardiac arrest: A scoping review of current literature.

Ornowska M(1), Wormsbecker A(2)(3), Andolfatto G(4), Leung TS(2)(5)(6), Khan I(2)(4), Medvedev G(2)(7).

ABSTRACT

AIMS: The objective of this article is to summarize the state of the literature surrounding the use of ketamine as a neuroprotective agent following cardiac arrest. METHODS: Five electronic databases were used to search for studies related to the use of ketamine for neuroprotection following cardiac arrest. This search was performed once in May 2020, and an updated search was conducted in May 2021 and March 2022. RESULTS: All searches combined retrieved 181 results; no clinical trials were identified. As such, the authors were limited to writing a scoping review of the literature rather than a systematic review. CONCLUSIONS: The current state of the literature describes the mechanism of action of ketamine as a neuroprotective agent through its action as an NMDA antagonist. There is evidence of its efficacy as a neuroprotective agent in preclinical models of cardiac arrest. Current published clinical work supports the use of ketamine ameliorating neurologic outcomes in other conditions such as epilepsy, traumatic brain injury, and depression. The current state of the literature is reflective of the notion that the use of ketamine following cardiac arrest may result in improved neurologic outcomes. Future research directions should focus on the use of ketamine as a possible clinical intervention following cardiac arrest.

5. Resuscitation. 2022 Oct;179:189-196. doi: 10.1016/j.resuscitation.2022.06.016. Epub 2022 Jun 26.

Out-of-hospital cardiac arrest in pregnant women: A 55-patient French cohort study.

Canon V(1), Recher M(2), Lafrance M(3), Wawrzyniak P(4), Vilhelm C(3), Agostinucci JM(5), Thiriez S(6), Mansouri N(7), Morel-Maréchal E(8), Lagadec S(9), Leroy A(10), Vermersch C(11), Javaudin F(12), Hubert H(3); GR-RéAC.

ABSTRACT

AIM: To describe a cohort of pregnant women having suffered an out-of-hospital cardiac arrest (OHCA) and to compare them with nonpregnant women of childbearing age having suffered OHCA. METHODS: Study data were extracted from the French National OHCA Registry between 2011 and 2021. We compared patients in terms of characteristics, care and survival. RESULTS: We included 3,645 women of childbearing age (15-44) who had suffered an OHCA; 55 of the women were pregnant. Pregnant women were younger than nonpregnant victims (30 vs. 35 years, $p = 0.006$) and were more likely to have a medical history (76.4% vs. 50.5%, $p < 0.001$) and a medical cause of the OHCA (85.5% vs. 57.2%, $p < 0.001$). Advanced Life Support was more frequently administered to pregnant women (98.2%, vs. 72.0%; $p < 0.001$). In pregnant women, the median time of MICU arrival was 20 minutes for the Medical Intensive Care Unit with no difference with nonpregnant women. Survival rate on admission to hospital was higher among pregnant women (43.6% vs. 27.3%; $p = 0.009$). There was no difference in 30-day survival between pregnant and nonpregnant groups (14.5% vs. 7.3%; $p = 0.061$). Fetal survival was only observed for OHCAs that occurred during the pregnancy second or third trimester (survival rates: 10.0% and 23.5%, respectively). CONCLUSIONS: Our results show that resuscitation performance does not meet European Resuscitation Council's specific guidelines on OHCA in pregnant women. Although OHCA in pregnancy is rare, the associated prognosis is poor for both woman and fetus. Preventive measures should be reinforced, especially when pregnant women have medical history.

6. Resuscitation. 2022 Oct;179:88-93. doi: 10.1016/j.resuscitation.2022.08.003. Epub 2022 Aug 6.

Trends in EMS-attended out-of-hospital cardiac arrest survival, United States 2015-2019.

Odom E(1), Nakajima Y(2), Vellano K(2), Al-Araji R(2), Coleman King S(3), Zhang Z(3), Merritt R(3), McNally B(2).

ABSTRACT

AIM: Everyday, nearly 1000 U.S. adults experience out-of-hospital cardiac arrest (OHCA). Survival to hospital discharge varies across many factors, including sociodemographics, location of arrest, and whether bystander intervention was provided. The current study examines recent trends in OHCA survival by location of arrest using a cohort of emergency medical service (EMS) agencies that contributed data to the Cardiac Arrest Registry to Enhance Survival. METHODS: The 2015 CARES cohort (N = 122,613) includes EMS agencies contributing data across five consecutive years, 2015-2019. We assessed trends in EMS-attended OHCA survival for the 2015 CARES cohort by location of arrest - public, residential, nursing home. Unadjusted and adjusted percentages were estimated using 3-level hierarchical logistic regression models among cases aged 18-65 years. RESULTS: Overall, survival from EMS-attended OHCA significantly increased from 12.5% in 2015 to 13.8% in 2019 ($p = 0.001$). Survival from bystander witnessed arrests also increased significantly from 17.8% in 2015 to 19.7% in 2019 ($p = 0.004$). The trend for survival increased overall and for bystander witnessed OHCAs occurring in public places and nursing homes. CONCLUSION: Increasing trends for EMS-attended OHCA survival were observed in the overall and bystander witnessed groups. No change in the trend for survival was observed among OHCAs in the groups most likely to have a desirable outcome - bystander witnessed, with a shockable rhythm, and receiving bystander intervention. Reporting and monitoring of OHCA may be an important first step in improving outcomes. Additional community interventions focused on bystander CPR and AED use may be warranted.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2022 Oct;179:1-8. doi: 10.1016/j.resuscitation.2022.07.026. Epub 2022 Jul 26.
Continuous heart rate dynamics preceding in-hospital pulseless electrical activity or asystolic cardiac arrest of respiratory etiology.
Shan R(1), Yang J(2), Kuo A(3), Lee R(4), Hu X(5), Boyle NG(1), Do DH(6).
ABSTRACT
INTRODUCTION: Respiratory failure is a common cause of pulseless electrical activity (PEA) and asystolic cardiac arrest, but the changes in heart rate (HR) pre-arrest are not well described. We describe HR dynamics prior to in-hospital cardiac arrest (IHCA) among PEA/asystole arrest patients with respiratory etiology. METHODS: In this retrospective study, we evaluated 139 patients with 3-24 hours of continuous electrocardiogram data recorded preceding PEA/asystole IHCA from 2010-2017. We identified respiratory failure cases by chart review and evaluated electrocardiogram data to identify patterns of HR changes, sinus bradycardia or sinus arrest, escape rhythms, and development right ventricular strain prior to IHCA. RESULTS: A higher proportion of respiratory cases (58/73, 79 %) fit a model of HR response characterized by tachycardia followed by rapid HR decrease prior to arrest, compared to non-respiratory cases (30/66, 45 %, $p < 0.001$). Among the 58 respiratory cases fitting this model, 36 (62 %) had abrupt increase in HR occurring 64 (IQR 23-191) minutes prior to arrest, while 22 (38 %) had stable tachycardia until time of HR decrease. Mean peak HR was 123 ± 21 bpm. HR decrease occurred 3.0 (IQR 2.0-7.0) minutes prior to arrest. Sinus arrest occurred during the bradycardic phase in 42/58 of cases; escape rhythms were present in all but 2/42 (5 %) cases. Right ventricular strain ECG pattern, when present, occurred at a median of 2.2 (IQR -0.05-17) minutes prior to onset of HR decrease. CONCLUSION: IHCAs of respiratory etiology follow a model of HR increase from physiologic compensation to hypoxia, followed by rapid HR decrease prior to arrest.

2. Resuscitation. 2022 Oct;179:267-273. doi: 10.1016/j.resuscitation.2022.08.011. Epub 2022 Aug 23.
Duration of resuscitation and long-term outcome after in-hospital cardiac arrest: A nationwide observational study.
Yonis H(1), Andersen MP(2), Mills EHA(3), Winkel BG(4), Wissenberg M(5), Køber L(4), Gislason G(6), Folke F(7), Larsen JM(3), Søgaard P(3), Torp-Pedersen C(8), Kragholm KH(9).
ABSTRACT
BACKGROUND: Prior studies have investigated the association between duration of resuscitation and short-term outcomes following in-hospital cardiac arrest (IHCA). However, it remains unknown whether there is an association between duration of resuscitation and long-term survival and functional outcomes. METHOD: We linked data from the Danish in-hospital cardiac arrest registry with nationwide registries and identified 8,727 patients between 2013 and 2019. Patients were stratified into four groups (A-D) according to quartiles of duration of resuscitation. Standardized average probability of outcomes was estimated using logistic regression. RESULTS: Of 8,727 patients, 53.1% (n = 4,604) achieved return of spontaneous circulation. Median age was 74 (1st-3rd quartile [Q1-Q3] 65-81 years) and 63.1% were men. Among all IHCA patients the standardized 30-day survival was 62.0% (95% CI 59.8-64.2%) for group A (<5 minutes), 32.7% (30.8-34.6%) for group B (5-11 minutes), 14.4% (12.9-15.9%) for group C (12-20 minutes) and 8.1% (7.0-9.1%) for group D (21 minutes or more). Similarly, 1-year survival was also highest for group A (50.4%; 48.2-52.6%) gradually decreasing to 6.6% (5.6-7.6%) in group D. Among 30-day survivors, survival without anoxic brain damage or nursing home admission within one-year post-arrest was highest for group A (80.4%; 78.2-82.6%), decreasing to 73.3% (70.0-76.6%) in group B, 67.2% (61.7-72.6%) in group C and 73.3% (66.9-79.7%) in group D. CONCLUSION: Shorter duration of resuscitation attempt during an IHCA is associated with higher 30-day and 1-year survival. Furthermore, we found that the

majority of 30-day survivors were still alive 1-year post-arrest without anoxic brain damage or nursing home admission despite prolonged resuscitation.

3. Resuscitation. 2022 Oct;179:38-40. doi: 10.1016/j.resuscitation.2022.07.037. Epub 2022 Aug 3.
Patient-important outcomes following in-hospital cardiac arrest: Using frailty to move beyond prediction off immediate survival.
Mercier E(1), Mowbray FI(2).
NO ABSTRACT AVAILABLE

4. Intern Emerg Med. 2022 Oct;17(7):2143-2158. doi: 10.1007/s11739-022-03041-6. Epub 2022 Aug 29.
The impact of cognitive aids on resuscitation performance in in-hospital cardiac arrest scenarios: a systematic review and meta-analysis.
Corazza F(1), Fiorese E(2), Arpone M(2), Tardini G(2), Frigo AC(3), Cheng A(4), Da Dalt L(1)(2), Bressan S(5)(6).
ABSTRACT
Different cognitive aids have been recently developed to support the management of cardiac arrest, however, their effectiveness remains barely investigated. We aimed to assess whether clinicians using any cognitive aids compared to no or alternative cognitive aids for in-hospital cardiac arrest (IHCA) scenarios achieve improved resuscitation performance. PubMed, EMBASE, the Cochrane Library, CINAHL and ClinicalTrials.gov were systematically searched to identify studies comparing the management of adult/paediatric IHCA simulated scenarios by health professionals using different or no cognitive aids. Our primary outcomes were adherence to guideline recommendations (overall team performance) and time to critical resuscitation actions. Random-effects model meta-analyses were performed. Of the 4.830 screened studies, 16 (14 adult, 2 paediatric) met inclusion criteria. Meta-analyses of eight eligible adult studies indicated that the use of electronic/paper-based cognitive aids, in comparison with no aid, was significantly associated with better overall resuscitation performance [standard mean difference (SMD) 1.16; 95% confidence interval (CI) 0.64; 1.69; I2 = 79%]. Meta-analyses of the two paediatric studies, showed non-significant improvement of critical actions for resuscitation (adherence to guideline recommended sequence of actions, time to defibrillation, rate of errors in defibrillation, time to start chest compressions), except for significant shorter time to amiodarone administration (SMD - 0.78; 95% CI - 1.39; - 0.18; I2 = 0). To conclude, the use of cognitive aids appears to have benefits in improving the management of simulated adult IHCA scenarios, with potential positive impact on clinical practice. Further paediatric studies are necessary to better assess the impact of cognitive aids on the management of IHCA scenarios.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Pacing Clin Electrophysiol. 2022 Oct 8. doi: 10.1111/pace.14607. Online ahead of print.
Ventricular Arrhythmias in Kearns Sayre Syndrome: A Cohort Study Using the National Inpatient Sample Database 2016-2019.
Wiseman K(1), Gor D(1), Udongwo N(1), Alshami A(2), Upadhaya V(2), Daniels SJ(2), Chung WK(3)(4), Koo CH(2).
ABSTRACT

BACKGROUND: Degeneration of the cardiac conduction system resulting in complete heart block, ventricular arrhythmias (VA), and sudden cardiac death (SCD) is recognized in patients with Kearns Sayre Syndrome (KSS) and potentially preventable with permanent pacemaker (PPM) implantation. However, other mechanisms for SCD have been proposed, and the efficacy of implanting a defibrillator instead of PPM remains to be investigated. METHODS: We utilized the National Inpatient Sample (NIS) database 2016-2019 to investigate the risk VA or dysrythmic cardiac arrest (dCA) in KSS patients. We compared the outcomes of KSS to myotonic dystrophy (MD), a more common genetic disorder with similar clinical cardiac features and course. RESULTS: We identified 640 admissions for KSS. VA or dCA were lower in admissions for KSS than MD patients (2.3% vs 4.5%, p = 0.009). Device implantation differed between study groups. Approximately, 70% of cases with KSS and conduction abnormalities had pacemaker (± defibrillator) on hospital discharge, compared to 35% in MD. Conduction abnormalities were associated with higher rates of VA or dCA in both study groups. None of the admissions for KSS patients who developed VA or dCA had a pacemaker, and all of them had conduction abnormalities. One third of admissions for MD patients who developed VA or dCA had a device already implanted prior to the event. CONCLUSION: Despite its effectiveness in preventing VA, PPM remains underutilized in patients with KSS or MD who have conduction abnormalities. PPM alone do not fully prevent VA in MD patients; therefore, addition of defibrillator capacity might be necessary.

2. Heart Lung Circ. 2022 Oct 4:S1443-9506(22)01082-4. doi: 10.1016/j.hlc.2022.08.010. Online ahead of print.

Short-Term Exposure to Sulfur Dioxide and Nitrogen Monoxide and Risk of Out-of-Hospital Cardiac Arrest.

Zhao B(1), Johnston FH(2), Salimi F(3), Oshima K(4), Kurabayashi M(5), Negishi K(6).

ABSTRACT

BACKGROUND & AIMS: Over the past decades, particulate matter (PM), especially fine PM <2.5 μm in aerodynamic diameter (PM2.5) has been a major research focus. However, the air pollutant is a mixture of gases or vapour-phase compounds, such as carbon monoxide (C), nitrogen oxides (NOx), photochemical oxidants (Ox), and sulfur dioxide (SO2). Little is known about their cardiovascular effect, individually or in combination with PM. Thus, we aimed to determine the associations between the incidence of acute cardiac events and both gaseous and PM using a case-crossover design. METHODS: Cardiovascular cases were identified through the Gunma Prefectural Ambulance Activity Database in Japan in 2015 (1,512 out-of-hospital cardiac arrest [OHCA] and 1,002 heart failures from 53,006 ambulance cases). Air quality data from the nearest station was for day of the arrest (lag0) and 1-2 days before the arrest (lag1, lag2) and the moving average across days 0-1 (lag0-1). Conditional logistic regression was used for unadjusted and adjusted analysis for temperature and humidity. RESULTS: Independent associations of OHCA were daily concentrations of SO2 at lag1 (OR 1.173, 95%CI 1.004, 1.370; p=0.044) and lag0-1 (OR 1.203, 95%CI 1.015, 1.425; p=0.033); and daily NO concentrations at lag2 (OR 1.039, 95%CI 1.007, 1.072; p=0.016). The incidence of heart failure was significantly associated with daily concentrations of Ox on the day of the event in univariable model but not after adjustment for temperature and humidity. No associations were found for other pollutants. CONCLUSIONS: Short-term exposure to SO2 and NO are associated with an increased risk of OHCA.

3. Sci Rep. 2022 Oct 3;12(1):16513. doi: 10.1038/s41598-022-21054-1.

Investigation of acute organophosphate poisoning in humans based on sociodemographic and role of neurotransmitters with survival study in South India.

Sinha SN(1), Kumpati RK(2), Ramavath PN(3), Sangaraju R(2), Gouda B(2), Chougule P(2).

ABSTRACT

The aim of this study was to investigate the sociodemographic characteristics of patients based on the poison chosen and different types of organophosphorus compounds. The data were collected to explore the sociodemographic characteristics of organophosphate (OP)-poisoned patients based on the source, site, and route of poisoning, education level, occupational status, and the purpose of poisoning. Furthermore, we estimated the serotonin and dopamine levels in the plasma samples of patients, and survival plots were also described. During the study of OP pesticide poisoning in 116 human subjects and 5 healthy volunteers, we observed, based on the survival plot, that75.9% of the patients were discharged, and the remaining patients died (24.1% of the patients) due to respiratory failure followed by cardiac arrest. Our findings suggest that the serotonin levels significantly ($p < 0.01$ and $p < 0.001$) decreased from 12 to 36 h, whereas the dopamine levels slightly increased from 12 to 36 h in the group with OP poisoning compared to the control group. Based on these findings, this study may aid in deciphering the precise mechanism by which pesticides cause behavioural changes that influence serotonin and dopamine levels in OP-poisoned patients. The purpose of this work was to serve as a small reminder of the risk to public health associated with organophosphate pesticides.

4. Heart Rhythm. 2022 Oct;19(10):1684-1685. doi: 10.1016/j.hrthm.2022.04.026. Epub 2022 Apr 29.

Mitral valve abnormalities in decedents of sudden cardiac death due to hypertrophic cardiomyopathy and idiopathic left ventricular hypertrophy.

Bhatia RT(1), Khoury S(1), Westaby J(1), Behr ER(1), Papadakis M(1), Sharma S(1), Finocchiaro G(2), Sheppard MN(3).

NO ABSTRACT AVAILABLE

5. Resuscitation. 2022 Oct;179:105-113. doi: 10.1016/j.resuscitation.2022.08.008. Epub 2022 Aug 11.

Use of torsades de pointes risk drugs among patients with out-of-hospital cardiac arrest and likelihood of shockable rhythm and return of spontaneous circulation: A nationwide study.

Krøll J(1), Jespersen CHB(2), Kristensen SL(2), Fosbøl EL(2), Vinding NE(2), Lippert F(3), Kragholm K(4), Jøns C(2), Hansen SM(4), Køber L(2), Jacobsen PK(2), Tfelt-Hansen J(5), Weeke PE(2).

ABSTRACT

AIM: Treatment with certain drugs can augment the risk of developing malignant arrhythmias (e.g. torsades de pointes [TdP]). Hence, we examined the overall TdP risk drug use before out-of-hospital cardiac arrest (OHCA) and possible association with shockable rhythm and return of spontaneous circulation (ROSC). METHODS: Patients ≥18 years with an OHCA of cardiac origin from the Danish Cardiac Arrest Registry (2001-2014) and TdP risk drug use according to www.CredibleMeds.org were identified. Factors associated with TdP risk drug use and secondly how use may affect shockable rhythm and ROSC were determined by multivariable logistic regression. RESULTS: We identified 27,481 patients with an OHCA of cardiac origin (median age: 72 years [interquartile range 62.0, 80.0 years]). A total of 37% were in treatment with TdP risk drugs 0-30 days before OHCA compared with 33% 61-90 days before OHCA ($p < 0.001$). Most commonly used TdP risk drugs were citalopram (36.1%) and roxithromycin (10.7%). Patients in TdP risk drug treatment were older (75 vs 70 years) and more comorbid compared with those not in treatment. Subsequently, TdP risk drug use was associated with less likelihood of the presenting rhythm being shockable (odds ratio [OR] = 0.63, 95% confidence interval [CI]:0.58-0.69) and ROSC (OR = 0.73, 95% CI:0.66-0.80). CONCLUSION: TdP risk drug use increased in the time leading up to OHCA and was associated with reduced likelihood of presenting with a shockable rhythm and ROSC in an all-comer OHCA setting. However, patients in TdP risk drug treatment were older and more comorbid than patients not in treatment.

END-TIDAL CO_2

1. Resuscitation. 2022 Sep 29:S0300-9572(22)00676-1. doi: 10.1016/j.resuscitation.2022.09.019. Online ahead of print.

The Association Between Arterial-End-Tidal Carbon Dioxide Difference and Outcomes After Out-of-Hospital Cardiac Arrest.

Abrahamowicz AA(1), Counts CR(2), Danielson KR(3), Bulger NE(4), Maynard C(5), Carlbom DJ(6), Swenson ER(6), Latimer AJ(7), Yang B(8), Sayre MR(2), Johnson NJ(9).

ABSTRACT

AIM: We sought to determine if the difference between PaCO2 and ETCO2 is associated with hospital mortality and neurologic outcome following out-of-hospital cardiac arrest (OHCA). METHODS: This was a retrospective cohort study of adult patients who achieved return of spontaneous circulation (ROSC) after OHCA over 3 years. The primary exposure was the PaCO2-ETCO2 difference on hospital arrival. The primary outcome was survival to hospital discharge. The secondary outcome was favorable neurologic status at discharge. We used receiver operating characteristic (ROC) curves to determine discrimination threshold and multivariate logistic regression to examine the association between the PaCO2- ETCO2 difference and outcome. RESULTS: Of 698 OHCA patients transported to the hospitals, 381 had sustained ROSC and qualifying ETCO2 and PaCO2 values. Of these, 160 (42%) survived to hospital discharge. Mean ETCO2 was 39 mmHg among survivors and 43 mmHg among non-survivors. Mean PaCO2-ETCO2 was 6.8 mmHg and 9.0 mmHg ($p < 0.05$) for survivors and non-survivors. After adjustment for Utstein characteristics, a higher PaCO2-ETCO2 difference on hospital arrival was not associated with hospital mortality (OR 0.99, 95% CI: 0.97-1.0) or neurological outcome. Area under the ROC curve or PaCO2-ETCO2 difference was 0.56 (95% CI 0.51-0.62) compared with 0.58 (95% CI 0.52-0.64) for ETCO2. CONCLUSION: Neither PaCO2-ETCO2 nor ETCO2 were strong predictors of survival or neurologic status at hospital discharge. While they may be useful to guide ventilation and resuscitation, these measures should not be used for prognostication after OHCA.

ORGAN DONATION

1. Arch Pediatr. 2022 Oct;29(7):502-508. doi: 10.1016/j.arcped.2022.06.004. Epub 2022 Aug 5.

Organ donation by Maastricht-III pediatric patients: Recommendations of the Groupe Francophone de Réanimation et Urgences Pédiatriques (GFRUP) and Association des Anesthésistes Réanimateurs Pédiatriques d'Expression Française (ADARPEF) Part I: Ethical considerations and family care.

Gaillard-Le Roux B(1), Cremer R(2), de Saint Blanquat L(3), Beaux J(4), Blanot S(5), Bonnin F(6), Bordet F(7), Deho A(8), Dupont S(8), Klusiewicz A(9), Lafargue A(10), Lemains M(9), Merchaoui Z(11), Quéré R(6), Samyn M(12), Saulnier ML(13), Temper L(14), Michel F(15), Dauger S(16); Groupe Francophone de Réanimation et Urgences Pédiatriques (GFRUP) and Association des Anesthésistes-Réanimateurs Pédiatriques d'Expression Française.

ABSTRACT

The French Transplant Health Authority (Agence de la Biomédecine) has broadened its organ- and tissue-donation criteria to include pediatric patients whose death is defined by circulatory criteria and after the planned withdrawal of life-sustaining therapies (WLST) (Maastricht category III). A panel of pediatric experts convened to translate data in the international literature into recommendations for organ and tissue donation in this patient subgroup. The panel estimated that,

among children aged 5 years or over with severe irreversible neurological injury (due to primary neurological injury or post-anoxic brain injury) and no progression to brain death, the number of potential donors, although small, deserves attention. The experts emphasized the importance of adhering strictly to the collegial procedure for deciding to withdraw life support. Once this decision is made, the available data should be used to evaluate whether the patient might be a potential donor, before suggesting organ donation to the parents. This suggestion should be reserved for parents who have unequivocally manifested their acceptance of WLST. The discussion with the parents should include both the pediatric intensive care unit (PICU) team under the responsibility of a senior physician and the hospital organ- and tissue-procurement team. All recommendations about family care during the end of life of a child in the PICU must be followed. The course and potential challenges of organ donation in Maastricht-III pediatric patients must be anticipated. The panel of experts recommended strict compliance with French recommendations (by the Groupe Francophone de Réanimation et Urgences Pédiatriques) about WLST and providing deep and continuous sedation until circulatory arrest. The experts identified the PICU as the best place to implement life-support discontinuation and emphasized the importance of returning the body to the PICU after organ donation. French law prohibits the transfer of these patients from one hospital to another. A description of the expert-panel recommendations regarding the organization and techniques appropriate for children who die after controlled circulatory arrest (Maastricht III) is published simultaneously in the current issue of this journal.

FEEDBACK

No articles identified.

DRUGS

1. Pediatr Crit Care Med. 2022 Oct 1;23(10):848-851. doi: 10.1097/PCC.0000000000003059. Epub 2022 Oct 3.

Sodium Bicarbonate and Poor Outcomes in Cardiopulmonary Resuscitation: Coincidence or Culprit?

DelSignore L(1).

NO ABSTRACT AVAILABLE

2. Resusc Plus. 2022 Sep 24;12:100308. doi: 10.1016/j.resplu.2022.100308. eCollection 2022 Dec.

Corticosteroid use with extracorporeal cardiopulmonary resuscitation for out-of-hospital cardiac arrest: A nationwide observational study.

Hirano T(1), Nakajima M(2)(3)(4), Ohbe H(3), Kaszynski RH(4), Iwasaki Y(5), Arakawa Y(6), Sasabuchi Y(7), Fushimi K(8), Matsui H(3), Yasunaga H(3).

ABSTRACT

AIM: Several studies have reported that corticosteroid administration for cardiac arrest patients may improve outcomes. However, these previous studies have not examined the effect of corticosteroid use in out-of-hospital cardiac arrest (OHCA) patients administered extracorporeal cardiopulmonary resuscitation (ECPR). Therefore, we aimed to examine the effectiveness of corticosteroids in OHCA patients administered ECPR. METHODS: Using the Japanese Diagnosis Procedure Combination inpatient database, we included OHCA patients who were administered ECPR on the day of admission between July 2010 and March 2019. The patients were categorized into the corticosteroid and control groups according to whether they received corticosteroids on the day of admission or

not. The primary outcome was in-hospital mortality and the secondary outcomes included percentages of neurologically favorable survival, major bleeding complications, and infection-related complications. We compared the outcomes using a propensity score matching analysis. RESULTS: We identified 6,142 eligible patients (459 vs 5,683, the corticosteroid and control group, respectively). One-to-four propensity score matching analysis (457 vs 1,827) showed in-hospital mortality was significantly higher in the corticosteroid group compared with the control group (82.1% vs 76.6%; risk difference, 5.5%; 95% CI, 1.5 to 9.5%). Neurologically favorable outcomes did not differ between the two groups (13.6% vs 16.9%; risk difference, -3.3%; 95% CI, -6.9 to 0.3%). The percentage of major bleeding complications and infection-related complications did not significantly differ between the two groups. CONCLUSIONS: The results of this study demonstrated that administration of corticosteroids on the day of admission to OHCA patients administered ECPR was associated with increased in-hospital mortality.

3. Resuscitation. 2022 Oct;179:21-24. doi: 10.1016/j.resuscitation.2022.07.034. Epub 2022 Jul 30.
Effect of calcium vs. placebo on long-term outcomes in patients with out-of-hospital cardiac arrest.
Vallentin MF(1), Granfeldt A(2), Meilandt C(1), Povlsen AL(1), Sindberg B(3), Holmberg MJ(4), Iversen BN(5), Mærkedahl R(6), Mortensen LR(7), Nyboe R(8), Vandborg MP(9), Tarpgaard M(6), Runge C(10), Christiansen CF(11), Dissing TH(5), Terkelsen CJ(12), Christensen S(2), Kirkegaard H(13), Andersen LW(14).

ABSTRACT
OBJECTIVE: The Calcium for Out-of-hospital Cardiac Arrest (COCA) trial was a randomized, placebo-controlled, double-blind trial of calcium for out-of-hospital cardiac arrest. The primary and secondary outcomes have been reported previously. This article describes the long-term outcomes of the trial. METHODS: Patients aged ≥18 years were included if they had a non-traumatic out-of-hospital cardiac arrest during which they received adrenaline. The trial drug consisted of calcium chloride (5 mmol) or saline placebo given after the first dose of adrenaline and again after the second dose of adrenaline for a maximum of two doses. This article presents pre-specified analyses of 6-month and 1-year outcomes for survival, survival with a favorable neurological outcome (modified Rankin Scale of 3 or less), and health-related quality of life. RESULTS: A total of 391 patients were analyzed. At 1 year, 9 patients (4.7%) were alive in the calcium group while 18 (9.1%) were alive in the placebo group (risk ratio 0.51; 95% confidence interval 0.24, 1.09). At 1 year, 7 patients (3.6%) were alive with a favorable neurological outcome in the calcium group while 17 (8.6%) were alive with a favorable neurological outcome in the placebo group (risk ratio 0.42; 95% confidence interval 0.18, 0.97). Outcomes for health-related quality of life likewise suggested harm of calcium but results were imprecise with wide confidence intervals. CONCLUSIONS: Effect estimates remained constant over time suggesting harm of calcium but with wide confidence intervals. The results do not support calcium administration during out-of-hospital cardiac arrest.

4. Resuscitation. 2022 Oct;179:94-96. doi: 10.1016/j.resuscitation.2022.08.007. Epub 2022 Aug 12.
Aortic occlusion during cardiac arrest - Mechanical adrenaline?
Brede JR(1).
NO ABSTRACT AVAILABLE

TRAUMA

1. Acute Med Surg. 2022 Sep 30;9(1):e792. doi: 10.1002/ams2.792. eCollection 2022 Jan-Dec.
Combined, converted, and prophylactic use of resuscitative endovascular balloon occlusion of the aorta for severe torso trauma: a retrospective study.

Irahara T(1), Oishi D(1), Tsuda M(1), Kajita Y(1), Mori H(1), Terashima T(1), Tanabe S(1), Hattori M(1), Kuge Y(1), Takeyama N(1).

ABSTRACT

INTRODUCTION: Resuscitative endovascular balloon occlusion of the aorta (REBOA) is used as an intra-aortic balloon occlusion in Japan; however, protocols for its effective use in different conditions have not been established. This study aimed to summarize the strategies of REBOA use in severe torso trauma. METHODS: Twenty-nine cases of REBOA for torso trauma treated at our hospital over 5 years were divided into hemodynamically unstable (HU) (n = 12), cardiac arrest (CA) (n = 13), and hemodynamically stable (HS) (n = 4) groups. We retrospectively examined patient characteristics, trauma mechanism, injury site, severity score, intervention type, and survival rates at 24 h in each group. RESULTS: In the HU group, 9 and 3 patients survived and died within 24 h, respectively; time to intervention (56.6 versus 130.7 min, P = 0.346) tended to be shorter and total occlusion time (40.2 versus 337.7 min, P = 0.009) was significantly shorter in survivors than in nonsurvivors. In the CA group, 10 patients were converted from resuscitative thoracotomy with aortic cross-clamp (RTACC); one patient survived. All four patients in the HS group survived, having received prophylactic REBOA. CONCLUSION: The efficacy of REBOA for severe torso trauma depends on the patient's condition. If the patients are hemodynamically unstable, time to intervention and total occlusion time could correlate with survival. The combined use of REBOA with definitive hemostasis could improve outcomes. Conversion from RTACC in the cardiac arrest patients and prophylactic use in the hemodynamically stable patients can be one of the potentially effective options, although further studies are needed.

2. Resuscitation. 2022 Oct;179:97-104. doi: 10.1016/j.resuscitation.2022.08.005. Epub 2022 Aug 12.

Prehospital care for traumatic cardiac arrest in the US: A cross-sectional analysis and call for a national guideline.

Ordoobadi AJ(1), Peters GA(2), MacAllister S(3), Anderson GA(1), Panchal AR(4), Cash RE(5).

ABSTRACT

AIM: We describe emergency medical services (EMS) protocols and prehospital practice patterns related to traumatic cardiac arrest (TCA) management in the U.S. METHODS: We examined EMS management of TCA by 1) assessing variability in recommended treatments in state EMS protocols for TCA and 2) analyzing EMS care using a nationwide sample of EMS activations. We included EMS activations involving TCA in adult (≥18 years) patients where resuscitation was attempted by EMS. Descriptive statistics for recommended and actual treatments were calculated and compared between blunt and penetrating trauma using $\chi 2$ and independent 2-group Mann-Whitney U tests. RESULTS: There were 35 state EMS protocols publicly available for review, of which 16 (45.7%) had a specific TCA protocol and 17 (48.5%) had a specific termination of resuscitation protocol for TCA. Recommended treatments varied. We then analyzed 9,565 EMS activations involving TCA (79.1% blunt, 20.9% penetrating). Most activations (93%) were managed by advanced life support. Return of spontaneous circulation was achieved in 25.5% of activations, and resuscitation was terminated by EMS in 26.4% of activations. Median prehospital scene time was 16.4 minutes; scene time was shorter for penetrating mechanisms than blunt (12.0 vs 17.0 min, $p < 0.001$). Endotracheal intubation was performed in 32.0% of activations, vascular access obtained in 66.6%, crystalloid fluids administered in 28.8%, and adrenaline administered in 60.1%. CONCLUSION: Actual and recommended approaches to EMS treatment of TCA vary nationally. These variations in protocols and treatments highlight the need for a standardized approach to prehospital management of TCA in the U.S.

VENTILATION

1. Resuscitation. 2022 Oct;179:50-58. doi: 10.1016/j.resuscitation.2022.07.042. Epub 2022 Aug 5.
Assessment of intensive care unit-free and ventilator-free days as alternative outcomes in the pragmatic airway resuscitation trial.
Wang HE(1), Panchal A(2), Madison Hyer J(3), Nichol G(4), Callaway CW(5), Aufderheide T(6), Nassal M(7), Vanden Hoek T(8), Li J(9), Daya MR(10), Hansen M(11), Schmicker RH(12), Idris A(13), Wei L(14).

ABSTRACT
OBJECTIVE: We sought to evaluate the utility and validity of ICU-free days and ventilator-free days as candidate outcomes for OHCA trials. METHODS: We conducted a secondary analysis of the Pragmatic Airway Resuscitation Trial. We determined ICU-free (days alive and out of ICU during the first 30 days) and ventilator-free days (days alive and without mechanical ventilation). We determined ICU-free and ventilator-free day distributions and correlations with Modified Rankin Scale (MRS). We tested associations with trial interventions (laryngeal tube (LT), endotracheal intubation (ETI)) using continuous (t-test), non-parametric (Wilcoxon Rank-Sum test - WRS), count (negative binomial - NB) and survival models (Cox proportional hazards (CPH) and competing risks regression (CRR)). We conducted bootstrapped simulations to estimate statistical power. MAIN RESULTS: ICU-free days was skewed; median 0 days (IQR 0, 0), survivors only 24 (18, 27). Ventilator-free days was skewed; median 0 (IQR 0, 0) days, survivors only 27 (IQR 23, 28). ICU-free and ventilator-free days correlated with MRS (Spearman's ρ = -0.95 and -0.97). LT was associated with higher ICU-free days using t-test (p = 0.001), WRS (p = 0.003), CPH (p = 0.02) and CRR (p = 0.04), but not NB (p = 0.13). LT was associated with higher ventilator-free days using t-test (p = 0.001), WRS (p = 0.001) and CRR (p = 0.03), but not NB (p = 0.13) or CPH (p = 0.13). Simulations suggested that t-test and WRS would have had the greatest power to detect the observed ICU- and ventilator-free days differences. CONCLUSION: ICU-free and ventilator-free days correlated with MRS and differentiated trial interventions. ICU-free and ventilator-free days may have utility in the design of OHCA trials.

CERERBRAL MONITORING

1. Resuscitation. 2022 Sep 19;180:59-63. doi: 10.1016/j.resuscitation.2022.09.008. Online ahead of print.
A change of perspective? An explorative study on why patients may not subjectively report cognitive impairments after a cardiac arrest.
van Gils P(1), van Heugten C(2), Sep S(3), Moulaert V(4), Hofmeijer J(5), Verbunt J(3).

ABSTRACT
AIM: Cardiac arrest survivors are at risk of long-term cognitive impairment. Patients with cognitive impairments do not always have cognitive complaints and vice versa. Not reporting cognitive complaints could be caused by a lack of awareness. We hypothesized that caregivers report more cognitive failures than patients, indicating patients' lack of insight into cognitive functioning. METHODS: This is a secondary analysis of the Activity and Life After Survival of Cardiac Arrest study on survivors of cardiac arrest and their caregivers. They were assessed at two weeks, three months, and one year after cardiac arrest. At each time point, the patient and the caregiver filled out the cognitive failure questionnaire (CFQ) regarding the patient. We analysed the correlation, intraclass correlation, and self-proxy discrepancy between patients and caregivers on the CFQ over time. RESULTS: One-hundred-and-nineteen cardiac arrest survivors (mean age = 60, 85 % male) and their caregivers were included. The CFQ scores of the patients and caregivers were equally low. The correlation (T1 r = 0.31; T2 r = 0.40; T3 r = 0.55) and intraclass correlation (T1 r = 0.48; T2 r = 0.56; T3 r = 0.71) between patient and caregiver increased over time. CONCLUSION: This study does not

support a lack of awareness of cognitive impairments by long-term cardiac arrest survivors. Future research may focus on alternative explanations for why patients have less cognitive complaints than expected based on the frequency of cognitive impairments. Possible explanations include a response shift.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Resuscitation. 2022 Oct 5:S0300-9572(22)00678-5. doi: 10.1016/j.resuscitation.2022.09.020. Online ahead of print.

Pediatric and Adult Out-of-Hospital Cardiac Arrest Incidence Within and Near Public Schools in British Columbia: Missed Opportunities for Systematic AED Deployment Strategies.

Danny Liang L(1), Benjamin Leung KH(2), C Y Chan T(2), Deakin J(3), Heidet M(4), Meckler G(5), Scheuermeyer F(6), Sanatani S(7), Christenson J(6), Grunau B(8).

ABSTRACT

BACKGROUND: Systematic automated external defibrillator(AED) placement in schools may improve pediatric out-of-hospital cardiac arrest(OHCA) survival. To estimate their utility, we identified school-located pediatric and adult OHCAs to estimate the potential utilization of school-located AEDs. Further, we identified all OHCAs within an AED-retrievable distance of the school by walking, biking, and driving. METHODS: We used prospectively collected data from the British Columbia(BC) Cardiac Arrest Registry(2013-2020), and geo-plotted all OHCAs and schools(n=824) in BC. We identified adult and pediatric(age < 18 years) OHCAs occurring in schools, as well as nearby OHCAs for which a school-based externally-placed AED could be retrieved by a bystander prior to emergency medical system(EMS) arrival. RESULTS: Of 16,409 OHCAs overall in the study period, 28.6% occurred during school hours. There were 301 pediatric OHCAs. 5(1.7%) occurred in schools, of whom 2(40%) survived to hospital discharge. Among both children and adults, 28(0.17%) occurred in schools (0.0042/school/year), of whom 21(75%) received bystander resuscitation, 4(14%) had a bystander AED applied, and 14(50%) survived to hospital discharge. For each AED, an average of 0.29 OHCAs/ year(95% CI 0.21-0.37), 0.93 OHCAs/year(95% CI 0.69-1.56) and 1.69 OHCAs/year(95% CI 1.21-2.89) would be within the potential retrieval distance of a school-located AED by pedestrian, cyclist and automobile retrieval, respectively, using the median EMS response times. CONCLUSION: While school-located OHCAs were uncommon, outcomes were favourable. 11.1% to 60.9% of all OHCAs occur within an AED-retrievable distance to a school, depending on retrieval method. Accessible external school-located AEDs may improve OHCA outcomes of school children and in the surrounding community.

2. Open Access Emerg Med. 2022 Sep 30;14:535-543. doi: 10.2147/OAEM.S349656. eCollection 2022.

Interprofessional On-floor Education on Oxygen Therapy in COVID-19 Patients, Cardiac Arrest, and Procedural Sedation: Perception of Health-care Workers in Emergency Setting.

Farooq M(1), Ahmad S(1), Hanjra FK(1), Zafar O(1), Bashir K(1).

ABSTRACT

OBJECTIVE: There is paucity of evidence for interprofessional education (IPE) conducted within the working environment of emergency departments (EDs). This study demonstrates favorable perception of on-floor IPE sessions conducted in a busy emergency department. MATERIALS AND

METHODS: Between January and December 2020, IPE was conducted in EDs using low fidelity manikins and involved nurses, doctors, respiratory therapists, and medical students already present on floor. The three key areas were, taught cardiac arrest, escalating oxygen therapy for COVID-19 patients, and procedural sedation. Each session lasted 30 min, and feedback was obtained immediately after the session in both transcribed and written forms through scannable survey monkey links. RESULTS: Forty-seven sessions were conducted covering the three topics for 141 participants. The majority of the participants benefited from on-floor IPE and preferred this approach in the future. Both participant and faculty recommended to have some protected time to maximize the learnings. CONCLUSION: IPE in the clinical environment is feasible, with careful planning it can enhance collaborative learning in the ED.

3. Jt Comm J Qual Patient Saf. 2022 Sep 5:S1553-7250(22)00190-8. doi: 10.1016/j.jcjq.2022.08.011. Online ahead of print.

Intraoperative Code Blue: Improving Teamwork and Code Response Through Interprofessional, In Situ Simulation.

Wu G, Podlinski L, Wang C, Dunn D, Buldo D, Mazza B, Fox J, Kostelnik M, Defenza G.

ABSTRACT

INTRODUCTION: An intraoperative cardiac arrest requires perioperative teams to be equipped with the technical skills, nontechnical skills, and confidence to provide the best resuscitative measures for the patient. In situ simulation (simulation conducted in health professionals' work environment, such as a patient care unit, and not in an off-site location) has the potential to improve team performance. The research team assessed the effects of in situ simulation on code response, teamwork, communication, and comfort in intraoperative resuscitations. METHODS: This study included seven interprofessional teams consisting of RNs, anesthesiologists, surgical technologists, and patient care technicians working in the operating room of a community hospital in New Jersey. The hour-long interdisciplinary simulation training sessions consisted of a code blue scenario run twice; both times video recorded, retrospectively reviewed, and compared to each other. Technical skills were measured by "time-to-tasks"; nontechnical skills were assessed using the Team Emergency Assessment Measure (TEAM) instrument. Self-reported comfort in skills was collected before the simulation program and after completion of the training. RESULTS: A total of 21 perioperative nurses, 7 anesthesiologists, 7 surgical technologists, and 4 patient care technicians participated from January to April 2021. There was a significant ($p < 0.05$) decrease in time to compressions (by 14 seconds, 53.5% improvement) and in time to defibrillation (by 49 seconds) between the two simulations. Significant improvements were noted in confidence levels of certain CPR-related technical skills. There were statistically significant improvements in TEAM scores in the two teams that performed lowest in the pre-debrief simulation ($p < 0.05$). CONCLUSION: In the operative setting, where time and space for training are limited, in situ simulation training was associated with improvement in technical skills of individuals and teams, with significantly improved teamwork in teams that required the most training. The long-term effects of such training and its effects on patient outcomes require additional research.

4. Resusc Plus. 2022 Sep 26;12:100307. doi: 10.1016/j.resplu.2022.100307. eCollection 2022 Dec.

The learning impact of a virtual CPR webinar for seniors.

Best B(1), Bissonnette E(2), Côté É(2), Henson A(3), Ohle R(4).

ABSTRACT

AIM: To assess the learning impact of a virtual interactive CPR webinar for seniors through mix-methods quantitative and qualitative survey analysis. METHODS: We surveyed 350 webinar attendees. The webinar trained participants in hands-only CPR technique and AED use. Survey

questions included multiple-choice selection and open-ended responses. Qualitative inductive thematic analysis was conducted on open-ended question responses. Knowledge of CPR was measured on a 3-point scale (very little knowledge, some knowledge, a lot of knowledge). Proportions were compared pre and post seminar using a z-test. RESULTS: 231 respondents ≥ 65 years participated in the survey (response rate 66.0 %). There was a significant increase in self-reported knowledge of CPR pre and post webinar (very little knowledge 33.9 % to 1.8 % $P < 0.00001$, some knowledge 54.2 % to 12.1 % $P < 0.0001$, a lot of knowledge 11.9 % to 86.1 % $P < 0.0001$). We found 5 main themes on participant feedback: Positive affective comments, learning, constructive criticism, the desire to share information and comments on CPR ability. We identified 4 main themes related to further questions: Performing CPR in different circumstances, risks of CPR, information sharing, and prevention of death from myocardial infarction. Following the webinar, 89.9 % of respondents chose that they would be very likely to perform CPR on a friend, family member or colleague. CONCLUSION: This study highlights the success of virtual CPR webinars for senior citizens in improving self-reported CPR knowledge. This has potential to address barriers to online education for seniors and increase bystander CPR rates.

5. Public Health. 2022 Oct 5;212:42-45. doi: 10.1016/j.puhe.2022.08.013. Online ahead of print.
Public awareness of cardiopulmonary resuscitation and cardiac arrest in association with Christian Eriksen.
Ferrell MC(1), Khojasteh J(2), Vassar M(3).
ABSTRACT
OBJECTIVES: During the Union of European Football Association EURO 2020 Football Championship, Danish football player Christian Eriksen experienced a cardiac arrest on the field of play. With prompt intervention and cardiopulmonary resuscitation (CPR), Erikson had a positive outcome and survived the arrest. Our goal is to determine the extent to which this event informed the general population about cardiac arrests and CPR. STUDY DESIGN: This was a cross-sectional internet analysis. METHODS: First, Google Trends was used to identify the search interest of topics "Cardiopulmonary resuscitation," "Myocardial infarction," and disease "Cardiac arrest" worldwide from May 29, 2021, to June 19, 2021. Second, we downloaded Twitter data via Sprout Social using the keywords "CPR" and "cardiac arrest," which are presented as the absolute number of tweets. An ARIMA model was used to forecast expected search volumes. RESULTS: The following week, there was an increase of 91.72% (95% confidence interval [CI] 89.01-94.93) for "Cardiac arrest" above expected values, an 80.67% (95% CI 75.84-85.5) increase for "Cardiopulmonary resuscitation," and a 65.50% (95% CI 62.98-68.02) increase for "Myocardial infarction." Within Twitter, there was a peak increase in daily tweets using "CPR" by 184,706 (95% CI 181,933-187,479) beyond expected values and a peak increase in the daily tweets using "cardiac arrest" by 73,126 (95% CI 72,499-73,752). CONCLUSION: Although all cardiac arrests are undesirable, public knowledge of the positive effects of CPR could contribute to a means of promoting and increasing the desire for CPR awareness as well as its application.

6. BMC Med Educ. 2022 Oct 7;22(1):710. doi: 10.1186/s12909-022-03775-z.
Assessment of life support skills of resident dentists using OSCE: cross-sectional survey.
Yang F(#)(1), Zheng C(#)(1), Zhu T(1), Zhang D(2).
ABSTRACT
BACKGROUND: The aim of this cross-sectional survey was to apply the Objective Structured Clinical Examination (OSCE) to evaluate the cardiopulmonary resuscitation (CPR) and endotracheal intubation skills of resident dentists for stage assessment in standardized training. METHODS: A total of 146 third-year resident dentists were recruited and randomly assigned to perform either CPR or

endotracheal intubation. Their performance was scored by experienced anesthesiologists with standardized scoring criteria. Participants were also asked to rated their self-assessed competence, willingness, and perceptions on training status using Likert-type scales in a questionnaire. Student's ttest was applied to compare scores for CPR and endotracheal intubation performed by resident dentists with different characteristics. The results of the questionnaires were analyzed and visualized by the R package 'Likert'. Significance was set at the $P < 0.05$ level. RESULTS: The mean OSCE score for endotracheal intubation (59.1 ± 12.5) was lower than that of CPR (72.4 ± 8.8). Participants with Master's degrees scored higher than those with Bachelor's degrees and Doctor of Philosophy (PhD) degrees in the assessment of CPR and endotracheal intubation. Low scores of self-assessed competence and willingness were observed, especially for endotracheal intubation. Resident dentists showed poor satisfaction on training volume and frequency of CPR and endotracheal intubation. CONCLUSION: Resident dentists showed poor performance on CPR and endotracheal intubation assessed by the OSCE. Relatively low self-assessed competence and willingness were reported in endotracheal intubation. The medical emergency curriculum for resident dentists should be more consistent and standardized to help resident dentists enhance the proficiency of life support skills.

7. Inquiry. 2022 Jan-Dec;59:469580221127134. doi: 10.1177/00469580221127134.
Basic Resuscitation Training for Third-Cycle Primary School Students: A Qualitative Research of Training Providers' Experiences.
Pivač S(1), Gradišek P(2)(3), Skela-Savič B(1).
ABSTRACT
The purpose of our research was to identify the experiences, obstacles, and self-reflective opinions regarding the qualifications of the training providers of cardiopulmonary resuscitation to third-cycle primary school students. The effectiveness and success of a training program in basic resuscitation procedures depend on the qualifications and knowledge of the training provider and the type of didactic materials used. The qualitative method was used with 3 non-homogenous focus groups. Training providers (n = 8) from primary health care participated. The selected text was analyzed using a thematic analysis. The focus groups were organized after the training conducted on basic resuscitation procedures to third-cycle primary school students in September and October 2018. Prior to conducting the research we gained approval by the Medical Ethics Committee. Twenty-five codes, 11 categories and 3 themes were designed: Obstacles that are present in conducting training on cardiopulmonary resuscitation, the effects of training on primary school students and the development of components of prosocial behavior, and systemic responsibility for the qualifications and knowledge of training providers. The research has found that training providers must have the skills and knowledge to motivate the participants of training sessions and encourage them to gain knowledge and skills on resuscitation. They should be familiar with various methods and forms of learning and use relevant teaching materials, so that they can conduct training sessions effectively. Activities are needed to implement minimal criteria for conducting training on resuscitation such as appropriately qualified providers that should follow the European Resuscitation Guidelines, an appropriate pedagogical approach employed by the providers, appropriate equipment and tools, content adjusted to the age of the primary school students, conducting training in small groups, revision of knowledge for training providers and primary school students.

8. Harm Reduct J. 2022 Oct 3;19(1):111. doi: 10.1186/s12954-022-00688-4.
'It's the same thing as giving them CPR training': rural first responders' perspectives on naloxone.
Filteau MR(1), Green B(2), Kim F(2), McBride KA(3).
ABSTRACT

The Substance Abuse and Mental Health Services Administration's (SAMHSA) Harm Reduction grant program expanded access to several harm reduction strategies to mitigate opioid overdose fatalities, including expanding access to naloxone. Interviews with first responders in a frontier and remote (FAR) state were conducted to understand their job responsibilities in relation to overdose response and prevention and their perceptions of training laypersons to administer naloxone. This study includes 22 interviews with law enforcement, EMS and/or fire personnel, and members of harm reduction-focused community organizations. The study finds widespread support for increasing access to naloxone and training laypersons in naloxone administration throughout Montana, due to rural first responders' inability to meet the needs of residents and an overall lack of resources to address addiction and the effects of fentanyl. Participants from harm reduction-focused community organizations convey support for training lay persons, but also illuminate that real and perceived cultural opposition to harm reduction strategies could reduce the likelihood that laypeople enroll in naloxone training. This study adds to the literature because it focuses on first responders in a FAR area that would benefit from layperson naloxone education and administration training due to its geographic expansiveness and the area's overall lack of access to medications for opioid use disorder or other treatment services. Expanding harm reduction approaches, like increasing access and training laypersons to administer naloxone, might be FAR residents' best chance for surviving an opioid overdose.

9. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue. 2022 Aug;34(8):789-801. doi: 10.3760/cma.j.cn121430-20220802-00709.

[Clinical practice guidelines for device supportive care in adults with post cardiac arrest syndrome in China]. [Article in Chinese]

Chinese Clinical Practice Guidelines For Device Support Treatment In Adults With Post-Cardiac Arrest Syndrome Working G(1), Resuscitation Group Of Emergency Medicine Branch Of Chinese Medical A, Chest Pain Group Of Emergency Medicine Branch Of Chinese Medical A, Cardio-Cerebrovascular Disease Group Of Emergency Medicine Branch Of Chinese Medical A, Joint Multidisciplinary Committee Of Cardiopulmonary Resuscitation And Extracorporeal Life Support Of Shandong Provincial Medical A.

ABSTRACT

Post cardiac arrest syndrome (PCAS) refers to the multiple organ dysfunction or failure after return of spontaneous circulation (ROSC) in cardiac arrest (CA) patients. PCAS is closely related to the prognosis of CA patients, and is an independent risk factor of survival. Device supportive care is critical for improving prognosis of PCAS. In order to guide and standardize device supportive care in PCAS among clinicians, nurses and research personnel in China, the working group drafted the first clinical practice guidelines for device supportive care in adults with PCAS according to World Health Organization (WHO) guideline development manual, with the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. The guidelines developed sixteen recommendations on seven types of devices in four aspects including neuroprotection, circulatory treatment, respiratory support and renal replacement therapy, providing references for clinical management of PCAS

10. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz. 2022 Oct;65(10):972-978. doi: 10.1007/s00103-022-03557-4. Epub 2022 Jun 20.

[The new 2021 resuscitation guidelines and the importance of lay resuscitation].

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

Horriar L(1), Rott N(2), Böttiger BW(1).

ABSTRACT

Lay resuscitation is one of the most important measures to increase the survival rate of patients after out-of-hospital cardiac arrest. While European countries, and especially Scandinavian countries, achieve lay resuscitation rates of over 80%, the rate in Germany is only around 40%. The 2021 Resuscitation Guidelines updated by the European Resuscitation Council give special weight to Systems Saving Lives and focus on resuscitation by laypersons. The Systems Saving Lives emphasize the interplay between all actors involved in the chain of survival and thereby specify the link between the emergency service and the general population. Based on the BIG FIVE survival strategies after cardiac arrest, five key strategies are outlined that can achieve the greatest improvement in survival. These are (1) increasing lay resuscitation rates through campaigns and KIDS SAVE LIVES school-based resuscitation training, (2) implementing telephone resuscitation in dispatch centers, (3) first responder systems, (4) advanced life support, and (5) specialized cardiac arrest centers.

POST-CARDIAC ARREST TREATMENTS

1. Resuscitation. 2022 Sep 30:S0300-9572(22)00677-3. doi: 10.1016/j.resuscitation.2022.09.018. Online ahead of print.

Association of Prehospital Hypotension Depth and Dose with Survival Following Out-of-Hospital Cardiac Arrest.

Smida T(1), Menegazzi JJ(2), Crowe RP(3), Weiss LS(2), Salcido DD(2).

ABSTRACT

INTRODUCTION: Hypotension following resuscitation from out-of-hospital cardiac arrest (OHCA)may cause harm by exacerbating secondary brain injury; however, limited research has explored this relationship. Our objective was to examine the association between duration and depth of prehospital post return of spontaneous circulation (ROSC) hypotension and survival. METHODS: We utilized the 2019 and 2020 ESO Data Collaborative public use research data sets for this study (ESO, Austin, TX). Hypotension dose (mmHg*min.), average prehospital systolic blood pressure (SBP), and lowest recorded prehospital SBP were calculated. The association of these measures with survival to home (STH) and rearrest were explored using multivariable logistic regression. Time to hypotension resolution analyses by hypotension management strategy (push dose vasopressors, vasopressor infusion, or fluid only) were conducted using adjusted Cox proportional hazards models. RESULTS: 17,280 OHCA patients met inclusion criteria, of which 3,345 had associated hospital outcome data. Over one-third (37.8%; 6,526/17,280) of all patients had at least one recorded SBP below 90 mmHg. When modeled continuously, average prehospital SBP(1.19[1.15, 1.23] per 10 mmHg), lowest prehospital SBP (1.20 [1.17, 1.24] per 10 mmHg), and hypotension dose (0.995 [0.993, 0.996] per mmHg*min.) were independently correlated with STH. Differences in hypotension management were not associated with differences in survival or time to hypotension resolution. CONCLUSION: Severity and duration of hypotension were significantly associated with worse outcomes in this dataset. Defining a threshold for hypotension requiring treatment above the classical SBP threshold of 90 mmHg may be warranted in the setting of prehospital post-resuscitation care.

2. Intern Emerg Med. 2022 Oct;17(7):2083-2092. doi: 10.1007/s11739-022-03011-y. Epub 2022 Jun 16.

Immediate coronary angiography and systematic targeted temperature management are associated with improved outcome in comatose survivors of cardiac arrest.

Dall'Ara G(1), Compagnone M(2), Spartà D(2), Carletti R(2), Grotti S(2), Guerrieri G(3), Gaetani S(4), Cortigiani M(5), Maitan S(4), Fabbri A(5), Ottani F(6)(7), Caravita L(2), Tarantino F(2), Galvani M(2)(7).

ABSTRACT

Rapid and systematic access to coronary angiography (CAG) and target temperature management (TTM) might improve outcome in comatose patients who survive cardiac arrest (CA). However, there is controversy around indicating immediate CAG in the absence of transmural ischemia on the electrocardiogram after return of spontaneous circulation (ROSC). We evaluated the short- and long-term outcome of patients undergoing systematic CAG and TTM, based on whether culprit lesion percutaneous coronary intervention (PCI) was performed. All consecutive comatose CA survivors without obvious extra-cardiac causes undergoing TTM were included. Analysis involved the entire population and subgroups, namely patients with initial unshockable rhythm, no ST elevation on electrocardiogram, and good neurological recovery. We enrolled 107 patients with a median age of 64.9 (57.7-73.6) years. The initial rhythm was shockable in 83 (77.6%). Sixty-six (61.7%) patients underwent PCI. In-hospital survival was 71%. It was 78.8% and 58.5% in those undergoing or not PCI ($p = 0.022$), respectively. Age, time from CA to ROSC and culprit lesion PCI were independent predictors of in-hospital survival. Long-term survival was significantly higher in patients who underwent PCI (respectively 61.5% vs 34.1%; Log-rank: $p = 0.002$). Revascularization was associated with better outcomes regardless of initial rhythm (shockable vs non-shockable) and ST deviation (elevation vs no-elevation), and improved the long-term survival of patients discharged with good neurological recovery. Systematic CAG and revascularization, when indicated, were associated with higher survival in comatose patients undergoing TTM, regardless of initial rhythm and ST deviation in the post-ROSC electrocardiogram. The benefit was sustained at long-term particularly in those with neurological recovery.

3. Eur Heart J Acute Cardiovasc Care. 2022 Sep 29;11(9):714-715. doi: 10.1093/ehjacc/zuac109.
Blood pressure and oxygenation targets after out-of-hospital cardiac arrest-trial (BOX).
van Diepen S(1), Tavazzi G(2)(3), Morrow DA(4).
NO ABSTRACT AVAILABLE

4. Eur Heart J Acute Cardiovasc Care. 2022 Sep 29;11(9):716-717. doi: 10.1093/ehjacc/zuac110.
Oxygenation targets in post-resuscitation care: a perspective of the BOX randomized clinical trial.
Tavazzi G(1)(2), van Diepen S(3), Morrow D(4).
NO ABSTRACT AVAILABLE

5. Resuscitation. 2022 Oct;179:163-171. doi: 10.1016/j.resuscitation.2022.06.010. Epub 2022 Jun 23.
Targeted plasma metabolomics in resuscitated comatose out-of-hospital cardiac arrest patients.
Paulin Beske R(1), Henriksen HH(2), Obling L(3), Kjærgaard J(3), Bro-Jeppesen J(4), Nielsen N(5), Johansson PI(6), Hassager C(7).
ABSTRACT
BACKGROUND: Out-of-hospital cardiac arrest (OHCA) is a leading cause of death. Even if successfully resuscitated, mortality remains high due to ischemic and reperfusion injury (I/R). The oxygen deprivation leads to a metabolic derangement amplified upon reperfusion resulting in an uncontrolled generation of reactive oxygen species in the mitochondria triggering cell death mechanisms. The understanding of I/R injury in humans following OHCA remains sparse, with no existing treatment to attenuate the reperfusion injury. AIM: To describe metabolic derangement in patients following resuscitated OHCA. METHODS: Plasma from consecutive resuscitated unconscious OHCA patients drawn at hospital admission were analyzed using ultra-performance-liquid-mass-spectrometry. Sixty-one metabolites were prespecified for quantification and studied. RESULTS: In total, 163 patients were included, of which 143 (88%) were men, and the median age was 62 years (53-68). All measured metabolites from the tricarboxylic acid (TCA) cycle were significantly higher in non-survivors vs. survivors (180-days survival). Hierarchical clustering identified four clusters (A-D) of patients with distinct metabolic profiles. Cluster A and B had higher levels of TCA metabolites, amino acids and acylcarnitine species compared to C and D. The mortality was significantly higher in cluster A and B (A:62% and B:59% vs. C:21 % and D:24%, $p < 0.001$). Cluster A and B had longer time to

return of spontaneous circulation (A:33 min (21-43), B:27 min (24-35), C:18 min (13-28), and D:18 min (12-25), p < 0.001). CONCLUSION: Circulating levels of metabolites from the TCA cycle best described the variance between survivors and non-survivors. Four different metabolic phenotypes with significantly different mortality were identified.

TARGETED TEMPERATURE MANAGEMENT

No articles identified.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

No articles identified.

PEDIATRICS AND CHILDREN

1. Pediatr Crit Care Med. 2022 Oct 1;23(10):784-792. doi: 10.1097/PCC.0000000000003045. Epub 2022 Jul 26.

Sodium Bicarbonate Use During Pediatric Cardiopulmonary Resuscitation: A Secondary Analysis of the ICU-RESUScitation Project Trial.

Cashen K(1), Reeder RW(2), Ahmed T(3), Bell MJ(4), Berg RA(5), Burns C(6), Carcillo JA(7), Carpenter TC(8), Dean JM(2), Diddle JW(4), Federman M(9), Fink EL(7), Frazier AH(10)(11), Friess SH(12), Graham K(5), Hall M(13), Hehir DA(5), Horvat CM(7), Huard LL(9), Maa T(13), Manga A(12), McQuillen PS(14), Morgan RW(5), Mourani PM(8), Nadkarni VM(5), Naim MY(5), Notterman D(15), Palmer CA(2), Pollack MM(4), Schneiter C(8), Sharron MP(4), Srivastava N(9), Wessel D(4), Wolfe HA(5), Yates AR(13), Zuppa AF(5), Sutton RM(5), Meert KL(3); for the Eunice Kennedy Shriver National Institute of Child Health and Human Development Collaborative Pediatric Critical Care Research Network (CPCCRN) and National Heart Lung and Blood Institute ICU-RESUScitation Project Investigators.

ABSTRACT

OBJECTIVES: To evaluate associations between sodium bicarbonate use and outcomes during pediatric in-hospital cardiac arrest (p-IHCA). DESIGN: Prespecified secondary analysis of a prospective, multicenter cluster randomized interventional trial. SETTING: Eighteen participating ICUs of the ICU-RESUScitation Project (NCT02837497). PATIENTS: Children less than or equal to 18 years old and greater than or equal to 37 weeks post conceptual age who received chest compressions of any duration from October 2016 to March 2021. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Child and event characteristics, prearrest laboratory values (2-6 hr prior to p-IHCA), pre- and intraarrest hemodynamics, and outcomes were collected. In a propensity score weighted cohort, the relationships between sodium bicarbonate use and outcomes were assessed. The primary outcome was survival to hospital discharge. Secondary outcomes included return of spontaneous circulation (ROSC) and survival to hospital discharge with favorable neurologic outcome. Of 1,100 index cardiopulmonary resuscitation events, median age was 0.63 years (interquartile range, 0.19-3.81 yr); 528 (48.0%) received sodium bicarbonate; 773 (70.3%) achieved ROSC; 642 (58.4%) survived to hospital discharge; and 596 (54.2%) survived to hospital discharge with favorable neurologic outcome. Among the weighted cohort, sodium bicarbonate use was associated with lower survival to hospital discharge rate (adjusted odds ratio [aOR], 0.7; 95% CI, 0.54-0.92; p = 0.01) and lower survival to hospital discharge with favorable neurologic outcome rate (aOR, 0.69; 95% CI, 0.53-0.91; p = 0.007). Sodium bicarbonate use was not associated with ROSC

(aOR, 0.91; 95% CI, 0.62-1.34; p = 0.621). CONCLUSIONS: In this propensity weighted multicenter cohort study of p-IHCA, sodium bicarbonate use was common and associated with lower rates of survival to hospital discharge.

EXTRACORPOREAL LIFE SUPPORT

1. Basic Clin Pharmacol Toxicol. 2022 Oct 5. doi: 10.1111/bcpt.13804. Online ahead of print.
Extracorporeal life support in cardiotoxicant poisoning - a narrative review.
Voicu S(1), M'Rad A(1), Malissin I(1), Deye N(1), Mégarbane B(1).
ABSTRACT
Extracorporeal life support (ECLS) improves circulation in life-threatening cardiac dysfunction or arrest patients. Its benefits in drug-induced cardiovascular complications are debated. Indications and outcomes are poorly established. We performed a narrative review discussing ECLS indications, timing, and results in cardiotoxicant-poisoned patients. The review was focused on antiarrhythmic drugs and aluminum phosphide. Literature analysis was limited to the past 30 years in adults. Most reports were single cases and retrospective except one prospective case series of limited size, two of them controlled. ECLS indications and timing were at the discretion of physicians in charge but mostly included persistent cardiovascular failure despite elevated doses of inotropic/vasopressor support associated with elevated blood lactate concentrations (usually, >5mmol/L) and collapsed left ventricular ejection fraction (LVEF; usually, ≤40%). Survival improved using ECLS versus standard care in one study. Survival was ~80% if ECLS was implemented in refractory cardiovascular failure and 25-66% if implemented in cardiac arrest. In two controlled studies, survival of ECLS-treated aluminum phosphide-poisoned patients was improved versus standard care, if implemented in the presence of systolic blood pressure≤80mmHg despite inotropic/vasopressor treatment, arterial pH≤7.0, and LVEF≤40%. Despite low-to-moderate level of evidence, ECLS seems effective to improve survival in selected cardiotoxicant-poisoned patients. Selection criteria need clarification.

2. ASAIO J. 2022 Oct 4. doi: 10.1097/MAT.0000000000001797. Online ahead of print.
Clinician Perspectives on Cannulation for Extracorporeal Cardiopulmonary Resuscitation: A Mixed Methods Analysis.
Wanigasekara D(1)(2), Pellegrino VA(3), Burrell AJ(3), Aung N(4), Gregory SD(1)(2).
ABSTRACT
Out-of-hospital cardiac arrest is a leading cause of mortality with survival rates of less than 10%. In selected patients, survival may be improved via timely application of extracorporeal cardiopulmonary resuscitation (ECPR). However, ECPR is a complex and resource intensive intervention with a high risk of complications that impair widespread clinical adoption. This study employed a mixed approach of qualitative interview analysis embedded with quantitative data collection to uncover the major hurdles faced by clinicians during ECPR initiation. We conducted semi-structured interviews with eight ECPR intensive care specialists with 2-10 years of experience working at a large, tertiary ECPR center in Australia. Clinicians identified dilation as the most time-consuming step, followed by draping, and decision-making during extracorporeal membrane oxygenation patient selection. The most challenging step was the decision-making for patient selection, followed by dilation and imaging. These findings uncovered key barriers to ECPR, and identified priority areas for further research and clinical training. Major logistical hindrances will require well-defined protocols and improved clinical training. Engineering innovations in the identified areas may improve the delivery of ECPR, making it simpler and faster to deliver.

3. Crit Care Med. 2022 Oct 3. doi: 10.1097/CCM.0000000000005679. Online ahead of print.
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.

4. Resusc Plus. 2022 Sep 24;12:100309. doi: 10.1016/j.resplu.2022.100309. eCollection 2022 Dec.

Cost-effectiveness of extracorporeal cardiopulmonary resuscitation for refractory out-of-hospital cardiac arrest: A modelling study.

Doan TN(1)(2), Rashford S(1), Pincus J(3), Bosley E(1)(4).

ABSTRACT

BACKGROUND: Extracorporeal cardiopulmonary resuscitation (E-CPR) is a method of CPR that passes the patient's blood through an extracorporeal membrane oxygenation (ECMO) device to provide mechanical haemodynamic and oxygenation support in cardiac arrest patients who are not responsive to conventional CPR (C-CPR). E-CPR is being adopted rapidly worldwide despite the absence of high quality trial data and its substantial cost. Published cost-effectiveness data for E-CPR are scarce. METHODS: We developed a mathematical model to estimate the cost-effectiveness of E-CPR relative to C-CPR in adult patients with refractory out-of-hospital cardiac arrest (OHCA). The model was a combination of a decision tree for the acute treatment phase and a Markov model for long-term periods. Cost-effectiveness was evaluated from the Australian health system perspective over lifetime. Cost-effectiveness was expressed as Australian dollars (AUD, 2021 value) per quality-adjusted life year (QALY) gained. Variables were parameterised using published data. Probabilistic and univariate sensitivity analyses were performed. RESULTS: The incremental cost-effectiveness ratio (ICER) of E-CPR was estimated to be AUD 45,716 per QALY gained over lifetime (95% uncertainty range 22,102-292,904). The cost-effectiveness of E-CPR was most sensitive to the outcome of the therapy. CONCLUSION: E-CPR has median ICER that is below common accepted willingness-to-pay thresholds. Local factors within the health care system need to be considered to determine the feasibility of implementing an effective E-CPR program.

5. Resuscitation. 2022 Sep 29:S0300-9572(22)00675-X. doi: 10.1016/j.resuscitation.2022.09.017. Online ahead of print.

Eligibility of Out-of-Hospital Cardiac Arrest Patients for Extracorporeal Cardiopulmonary Resuscitation in the United States: A Geographic Information System Model.

Gottula AL(1), Shaw CR(2), Gorder KL(3), Lane BH(4), Latessa J(5), Qi M(6), Koshoffer A(7), Al-Araji R(8), Young W(9), Bonomo J(10), Langabeer JR(11), Yannopoulos D(12), Henry TD(13), Hsu CH(14), Benoit JL(15); CARES Surveillance Group.

ABSTRACT

BACKGROUND: Recent evidence suggest that extracorporeal cardiopulmonary resuscitation (ECPR) may improve survival rates for nontraumatic out-of-hospital cardiac arrest (OHCA). Eligibility criteria for ECPR are often based on patient age, clinical variables, and facility capabilities. Expanding access to ECPR across the U.S. requires a better understanding of how these factors interact with transport time to ECPR centers. METHODS: We constructed a Geographic Information System (GIS) model to estimate the number of ECPR candidates in the U.S. We utilized a Resuscitation Outcome Consortium (ROC) database to model time-dependent rates of ECPR eligibility and the Cardiac Arrest Registry to Enhance Survival (CARES) registry to determine the total number of OHCA patients who meet pre-specified ECPR criteria within designated transportation times. The combined model was used to estimate the total number of ECPR candidates. RESULTS: There were 588,203 OHCA patients in the CARES registry from 2013 to 2020. After applying clinical eligibility criteria, 22,104 (3.76%) OHCA patients were deemed eligible for ECPR. The rate of ROSC increased with longer resuscitation time, which resulted in fewer ECPR candidates. The proportion of OHCA patients eligible for ECPR increased with older age cutoffs. Only 1.68% (9,889/588,203) of OHCA patients in the U.S. were eligible for ECPR based on a 45-minute transportation time to an ECMO-ready center model. CONCLUSIONS: Less than 2% of OHCA patients are eligible for ECPR in the U.S. GIS models can identify the impact of clinical criteria, transportation time, and hospital capabilities on ECPR eligibility to inform future implementation strategies.

6. Resuscitation. 2022 Oct;179:18-20. doi: 10.1016/j.resuscitation.2022.07.036. Epub 2022 Aug 3.

ECPR may be the most effective intervention for refractory cardiac arrest-ever.

Ciullo AL(1), Tonna JE(2).

NO ABSTRACT AVAILABLE

7. Resuscitation. 2022 Oct;179:214-220. doi: 10.1016/j.resuscitation.2022.07.003. Epub 2022 Jul 8.

ECPR(2): Expert Consensus on PeRcutaneous Cannulation for Extracorporeal CardioPulmonary Resuscitation.

Schmitzberger FF(1), Haas NL(2), Coute RA(3), Bartos J(4), Hackmann A(5), Haft JW(6), Hsu CH(2), Hutin A(7), Lamhaut L(7), Marinaro J(8), Nagao K(9), Nakashima T(10), Neumar R(2), Pellegrino V(11), Shinar Z(12), Whitmore SP(13), Yannopoulos D(14), Peterson WJ(15).

ABSTRACT

AIM: Extracorporeal cardiopulmonary resuscitation (ECPR) has emerged as a promising resuscitation strategy for select patients suffering from refractory out-of-hospital cardiac arrest (OHCA), though limited data exist regarding the best practices for ECPR initiation after OHCA. METHODS: We utilized a modified Delphi process consisting of two survey rounds and a virtual consensus meeting to systematically identify detailed best practices for ECPR initiation following adult non-traumatic OHCA. A modified Delphi process builds content validity and is an accepted method to develop consensus by eliciting expert opinions through multiple rounds of questionnaires. Consensus was achieved when items reached a high level of agreement, defined as greater than 80% responses for a particular item rated a 4 or 5 on a 5-point Likert scale. RESULTS: Snowball sampling generated a panel of 14 content experts, composed of physicians from four continents and five primary specialties. Seven existing institutional protocols for ECPR cannulation following OHCA were identified and merged into a single comprehensive list of 207 items. The panel reached consensus on 101 items meeting final criteria for inclusion: Prior to Patient Arrival (13 items), Inclusion Criteria (8), Exclusion Criteria (7), Patient Arrival (8), ECPR Cannulation (21), Go On Pump (18), and Post-

Cannulation (26). CONCLUSION: We present a list of items for ECPR initiation following adult nontraumatic OHCA, generated using a modified Delphi process from an international panel of content experts. These findings may benefit centers currently performing ECPR in quality assurance and serve as a template for new ECPR programs.

EXPERIMENTAL RESEARCH

1. Prehosp Emerg Care. 2022 Oct 4:1-7. doi: 10.1080/10903127.2022.2132333. Online ahead of print.

Sudden ECG Rhythm Changes after Return of Spontaneous Circulation in Porcine Models of Out-of-Hospital Cardiac Arrest: A Phenomenological Report.

Koller AC(1), Salcido DD(1), Genbrugge C(2), Menegazzi JJ(1).

ABSTRACT

Background: Observation of the electrocardiogram (ECG) immediately following return of spontaneous circulation (ROSC) in resuscitated swine has revealed the interesting phenomenon of sudden ECG rhythm changes (SERC) that occur in the absence of pharmacological, surgical, or other medical interventions.Objective: We sought to identify, quantify, and characterize post-ROSC SERC in successfully resuscitated swine.Methods: We reviewed all LabChart data from resuscitated approximately 4- to 6-month-old swine used for various experimental protocols from 2006 to 2019. We identified those that achieved sustained ROSC and analyzed their entire post-ROSC periods for evidence of SERC in the ECG, and arterial and venous pressure tracings. Presence or absence of SERC was confirmed independently by two reviewers (ACK, DDS). We measured the interval from ROSC to first SERC, analyzed the following metrics, and calculated the change from 60 sec pre-SERC (or from ROSC if less than 60 sec) to 60 sec post-SERC: heart rate, central arterial pressure (CAP), and central venous pressure (CVP).Results: Fifty-two 52 pigs achieved and sustained ROSC. Of these, we confirmed at least one SERC in 25 (48.1%). Two pigs (8%) each had two unique SERC events. Median interval from ROSC to first SERC was 3.8 min (inter-quartile range 1.0-6.9 min; range 16 sec to 67.5 min). We observed two distinct types of SERC: type 1) the post-SERC heart rate and arterial pressure increased (72% of cases); and type 2) the post-SERC heart rate and arterial pressure decreased (28% of cases). For type 1 cases, the mean (standard deviation- SD) heart rate increased by 33.6 (45.7) beats per minute (bpm). The mean (SD) CAP increased by 20.6 (19.2) mmHg. For type 2 cases, the mean (SD) heart rate decreased by 39.7 (62.3) bpm. The mean (SD) CAP decreased by 21.9 (15.6) mmHg. Conclusions: SERC occurred in nearly half of all cases with sustained ROSC and can occur multiple times per case. First SERC most often occurred within the first 4 minutes following ROSC. Heart rate, CAP, and CVP changed at the moment of SERC. We are proceeding to examine whether this phenomenon occurs in humans post-cardiac arrest and ROSC.

CASE REPORTS

1. Prehosp Disaster Med. 2022 Oct 4:1-10. doi: 10.1017/S1049023X2200139X. Online ahead of print.

A Successful Case of Cardiac Arrest due to Acute Myocarditis with COVID-19: 120 Minutes on Manual Cardiopulmonary Resuscitation then Veno-Arterial Extracorporeal Membrane Oxygenation.

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ABSTRACT

Acute myocarditis is one of the common complications of coronavirus disease 2019 (COVID-19) with a relatively high case fatality. Here reported is a fulminant case of a 42-year-old previously healthy

woman with cardiogenic shock and refractory cardiac arrest due to COVID-19-induced myocarditis who received veno-arterial (VA) extracorporeal membrane oxygenation (ECMO) after 120 minutes of cardiopulmonary resuscitation (CPR). This is the first adult case of cardiac arrest due to COVID-19-induced myocarditis supported by ECMO that fully recovered with normal neurological functions. The success of the treatment course with full recovery emphasized the potential role of ECMO in treating these patients.

2. Intern Emerg Med. 2022 Oct;17(7):2167-2168. doi: 10.1007/s11739-022-03045-2. Epub 2022 Jul 20.

Man receiving cardiopulmonary resuscitation.

Kang BH(#)(1), Chu SE(#)(2), Sun JT(#)(3).

NO ABSTRACT AVAILABLE

3. Ochsner J. 2022 Fall;22(3):253-257. doi: 10.31486/toj.21.0107.

Atropine, Ondansetron, and Ketorolac: Supplemental Management of Amniotic Fluid Embolism.

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ABSTRACT

Background: Amniotic fluid embolism (AFE) is a rare cause of severe maternal morbidity and mortality. No well-studied protocols are available for management of AFE. We present a case of cardiac arrest secondary to presumed AFE and the use of atropine-ondansetron-ketorolac (AOK). Case Report: A 34-year-old gravida 4, para 2012 underwent a repeat cesarean section at 39 weeks of gestation. After delivery of the placenta, hypoxia and hypotension developed, followed by cardiac arrest. Protocols for management of maternal cardiac arrest were followed. Echocardiogram demonstrated right ventricular dilation and hypokinesis. AOK was administrated during prolonged cardiac arrest, and spontaneous circulation returned. The patient was extubated on postoperative day 3 and discharged on postoperative day 10 without neurologic deficits. Conclusion: Management of AFE should include consideration of the addition of AOK to typical guidelines.