This week's PubMed 2nd – 8th April 2023: articles of interest n = 52

CPR AND COVID-19

No articles identified.

CPR/MECHANICAL CHEST COMPRESSION

1. Resusc Plus. 2023 Mar 21;14:100376. doi: 10.1016/j.resplu.2023.100376. eCollection 2023 Jun.
Analysis of continuous arterial blood pressure using LUCAS-assisted CPR during in-hospital cardiac arrest.
Ehntholt MS(1)(2)(3), Young BC(4)(3), Yellapantula S(5), Abella BS(1)(2).
NO ABSTRACT AVAILABLE

REGISTRIES, REVIEWS AND EDITORIALS

1. Emerg Med J. 2023 Apr 5:emermed-2022-212757. doi: 10.1136/emermed-2022-212757. Online ahead of print.
Bystander cardiopulmonary resuscitation and cardiac rhythm change over time in patients with out-of-hospital cardiac arrest.
Shibahashi K(1), Kato T(2), Hikone M(2), Sugiyama K(2).
ABSTRACT
BACKGROUND: Whether and how bystander cardiopulmonary resuscitation (CPR) modifies the cardiac rhythm after out-of-hospital cardiac arrest (OHCA) over time remains unclear. We investigated the association between bystander CPR and the likelihood of ventricular fibrillation (VF) or ventricular tachycardia (VT) as the first documented cardiac rhythm. METHODS: We identified individuals with witnessed OHCA of cardiac origin from a nationwide population-based OHCA registry in Japan between 1 January 2005 and 31 December 2019. The first documented cardiac rhythm was compared between patients who received bystander CPR and those who did not, using a 1:2 propensity score-matched analysis. RESULTS: Of 309 900 patients with witnessed OHCA of cardiac origin, 71 887 (23.2%) received bystander CPR. Propensity score matching paired 71 882 patients who received bystander CPR with 143 764 who did not. The likelihood of detecting a VF/VT rhythm was significantly higher among patients who received bystander CPR than among those who did not (OR 1.66; 95% CI 1.63 to 1.69; p<0.001). Comparing the two groups at each time point, the difference in the proportions of patients with VF/VT rhythms peaked at 15-20 min but was insignificant at 30 min postcollapse (15 min after collapse; 20.9% vs 13.9%; p<0.001). The likelihood of a pulseless electrical activity rhythm was significantly lower in patients who received bystander CPR during the first 25 min postcollapse (15 min after collapse; 26.2% vs 31.5%; p<0.001). The two groups had no significant difference in the likelihood of asystole (15 min after collapse; 51.0% vs 53.3%; p=0.078). CONCLUSION: Bystander CPR was associated with a higher VF/VT likelihood and a lower likelihood of pulseless electrical activity at first documented rhythm analysis. Our results support early CPR for OHCA and highlight the need for further research to understand whether and how CPR modifies the cardiac rhythm after arrest.

2. Resuscitation. 2023 Apr 6:109788. doi: 10.1016/j.resuscitation.2023.109788. Online ahead of print.

Drowning in the United States: Patient and Scene Characteristics using the novel CARES Drowning Variables.

Ryan K(1), Bui MD(2), Johnson B(3), Eddens KS(4), Schmidt A(5), Ramos WD(6).

ABSTRACT

INTRODUCTION: Drowning results in more than 360,000 deaths annually, making it the 3rd leading cause of unintentional injury death worldwide. Prior studies examining drowning internationally have reviewed factors surrounding drowning however in the U.S. limited data exists. This study evaluated the novel drowning elements collected in the Cardiac Arrest Registry to Enhance Survival (CARES) during the first 2 years of data collection. METHODS: A retrospective analysis of the CARES database identified cases of drowning etiology for the two years 2020 and 2021. Demographics and incident characteristics were collected. Characteristics included items such as body of water, precipitating event, and who extracted patients. Survival to hospital discharge and neurological outcomes were compared between groups based on who initiated CPR using Pearson's Chi-Squared tests. RESULTS: Among 1,767 drowning cases, 69.7% were male, 47.1% white and 11.9% survived to hospital discharge. Body of water was often natural body (36.2%) or swimming pool (25.9%) and bystanders removed the patient in 42.7% of incidents. Swimming was the most common activity at time of submersion (18.6%) however in 50.2% of cases, activity was unknown or missing. When compared to EMS/First Responder initiating CPR, odds of neurologically favorable survival were significantly higher in the Bystander initiated CPR group (OR=2.85, 95% confidence interval [CI] 2.02-4.01). CONCLUSION: In this national cohort of drowning patients in cardiac arrest, the novel CARES drowning elements provide additional detail of epidemiological factors. Bystander CPR was associated with improved neurological outcomes. Future studies utilizing the drowning elements can inform injury prevention strategies.

Reply to the comments on "Prevalence and related factors of do-not-resuscitate orders among in-hospital cardiac arrest patients".

Jiang T(1), Xu F(2).

NO ABSTRACT AVAILABLE

Cardiopulmonary arrest in acute type A aortic dissection-the call for a treatment algorithm!

Dumfarth J(1), Stastny L(1), Gasser S(1), Grimm M(1).

NO ABSTRACT AVAILABLE

Trends in out-of-hospital cardiac arrest across the world: additional data from the CanROC and RéAC national registries.

Heidet M(1), Grunau B(2), Vaillancourt C(3), Baert V(4); CanROC, Gr-RéAC, ReACanROC investigators.

NO ABSTRACT AVAILABLE

Comment on: Association between rate of change in PaCO2 and functional outcome for patients with hypercapnia after out-of-hospital cardiac arrest.

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

NO ABSTRACT AVAILABLE

A systematic review of global autopsy rates in all-cause mortality and young sudden death.
Paratz ED(1), Rowe SJ(2), Stub D(3), Pflaumer A(4), La Gerche A(2).
ABSTRACT
Autopsy is the gold standard method for determining cause of death. Young sudden death (SD) is a prototype condition in which autopsy is universally recommended. The aim of this review was to quantify real-world global rates of autopsy in either all-cause death or young SD. A systematic review was conducted. Rates of autopsy in all-cause death and in young SD were determined in each country using scientific and commercial search engines. In total, 59 of 195 countries (30.3%) reported autopsy rates in all-cause death, with rates varying from 0.01%-83.9%. Almost all of these figures derived from academic publications rather than governmental statistics. Only 16 of 195 countries (8.2%) reported autopsy rates in the context of young SD, with reported rates ranging from 5%-100%. The definition of "young" was heterogeneous. No governmental statistics reported autopsy rates in young SD. Risks of bias included inability to verify reported figures, heterogeneity in reporting of clinical vs medicolegal autopsies, and the small number of studies identified overall, resulting in the consistent exclusion of low- and middle-income countries. In conclusion, most countries globally do not report autopsy rates in either all-cause death (69.7%) or in SD (92.8%). Without transparent reporting of autopsy rates, global burdens of disease and rates of sudden cardiac death cannot be reliably calculated.

IN-HOSPITAL CARDIAC ARREST

Temporal variation in survival following in-hospital cardiac arrest in Sweden.
Hessulf F(1), Herlitz J(2), Lundgren P(3), Aune S(4), Myredal A(5), Engdahl J(6), Rawshani A(7).
ABSTRACT
BACKGROUND: The aim of the study was to investigate what characterizes IHCAs that take place during the "day" (Monday-Friday 7 am-3 pm), "evening" (Monday-Friday 3 pm-9 pm) and "night" (Monday-Friday 9 pm-7 am and Saturday-Sunday 12 am- 11.59 pm). METHODS: We used the Swedish Registry for CPR (SRCR) to study 26,595 patients from January 1, 2008 to December 31, 2019. Adult patients ≥18 years with a IHCA where resuscitation was initiated were included. Uni- and multivariable logistic regression was used to investigate associations between temporal factors and survival to 30 days. RESULTS: 30-day survival and Return of Spontaneous Circulation (ROSC) was 36.8% and 67.9% following CA during the day and decreased during the evening (32.0% and 66.3%) and night (26.2% and 60.2%) (p < 0.001 and p = 0.028). When comparing the survival rates between the day and the night, survival decreased more (change in relative survival rates) in small (<99 beds) compared to large (<400) hospitals (35.9% vs 25%), in non-academic vs academic hospitals (33.5% vs 22%) and on non-Electro Cardiogram (ECG)-monitored wards vs ECG-monitored wards (46.2% vs 20.9%) (p < 0.001 for all). IHCAs that took place during the day (adjusted Odds Ratio (aOR) 1.47 95% CI 1.35-1.60), in academic hospitals (aOR 1.14 95% CI 1.02-1.27) and in large (>400 beds) hospitals (aOR 1.31 95% CI 1.10-1.55) were independently associated with an increased chance of survival. CONCLUSIONS: Patients suffering an IHCA have an increased chance of survival during the day vs the evening vs night, and the difference in survival is even more pronounced when cared for at smaller, non-academic hospitals, general wards and wards without ECG-monitoring capacity.

INJURIES AND CPR

1. J Burn Care Res. 2023 Apr 3:irad047. doi: 10.1093/jbcr/irad047. Online ahead of print.
Regional Burn Review: Neither Parkland nor Brooke Formulas Reach 85% Accuracy Mark for Burn Resuscitation.

Dahl R(1), Galet C(2), Lilienthal M(2), Dwars B(2), Wibbenmeyer L(2).

ABSTRACT

Prolonged resuscitation can result in burn wound conversion and other complications. Our team switched from using Parkland (PF) to modified Brooke formula (BF) in January 2020. Secondary to difficult resuscitations using BF, we sought to review our data to identify factors associated with resuscitation requiring greater than predicted resuscitation with either formula, defined as 25% or more of predicted, hereafter referred to as over-resuscitation. Patients admitted to the burn unit between 1/1/2019 and 8/29/2021 for a burn injury with a percentage of total body surface area (%TBSA) ≥15% were included. Subjects <18 years, or weighing <30 kg, and those who died or had care withdrawn within 24 h of admission were excluded. Demographics, injury information, and resuscitation information were collected. Univariate and multivariate analyses were performed to identify factors associated with over-resuscitation by either formula. $P < 0.05$ was considered significant. Sixty-four patients were included; 27 were resuscitated using BF and 37 using PF. No significant differences were observed in demographics and burn injury between the groups. Patients required a median 3.59 mL/kg/%TBSA for BF and 3.99 mL/kg/%TBSA for PF to reach maintenance (p = 0.32). Over-resuscitation was more likely to occur when using BF compared to PF (59.3% vs. 32.4%, p = 0.043). Over-resuscitation was associated with longer time to reach maintenance (OR = 1.179 [1.042-1.333], p = 0.009) and arrival via ground transportation (OR = 10.523 [1.171-94.597], p = 0.036). Future studies are warranted to identify populations in which BF underperforms and sequelae associated with prolonged resuscitation.

CAUSE OF THE ARREST

1. Resuscitation. 2023 Apr 5:109789. doi: 10.1016/j.resuscitation.2023.109789. Online ahead of print.
Public interest in cardiac arrest in the United States following Damar Hamlin's injury on Monday Night Football.

Jacobs HR(1), Haight MA(2), Nguyen A(2), Sajjadi NB(2), Hartwell M(3).

NO ABSTRACT AVAILABLE

2. Clin Toxicol (Phila). 2023 Mar;61(3):173-180. doi: 10.1080/15563650.2022.2159427.
Opioid overdoses involving xylazine in emergency department patients: a multicenter study.

Love JS(1), Levine M(2), Aldy K(3)(4), Brent J(5), Krotulski AJ(6), Logan BK(6), Vargas-Torres C(1), Walton SE(6), Amaducci A(7), Calello D(8), Hendrickson R(9), Hughes A(9), Kurt A(7), Judge B(10), Pizon A(11), Schwarz E(12), Shulman J(11), Wiegan T(13), Wax P(3)(4), Manini AF(1).

ABSTRACT

INTRODUCTION: Illicit opioids, consisting largely of fentanyl, novel synthetic opioids, and adulterants, are the primary cause of drug overdose fatality in the United States. Xylazine, an alpha-2 adrenergic agonist and veterinary tranquilizer, is being increasingly detected among decedents following illicit opioid overdose. Clinical outcomes in non-fatal overdose involving xylazine are unexplored. Therefore, among emergency department patients with illicit opioid overdose, we evaluated clinical outcome differences for patients with and without xylazine exposures. METHODS: This multicenter, prospective cohort study enrolled adult patients with opioid overdose who

presented to one of nine United States emergency departments between 21 September 2020, and 17 August 2021. Patients with opioid overdose were screened and included if they tested positive for an illicit opioid (heroin, fentanyl, fentanyl analog, or novel synthetic opioid) or xylazine. Patient serum was analyzed via liquid chromatography quadrupole time-of-flight mass spectroscopy to detect current illicit opioids, novel synthetic opioids, xylazine and adulterants. Overdose severity surrogate outcomes were: (a) cardiac arrest requiring cardiopulmonary resuscitation (primary); and (b) coma within 4 h of arrival (secondary). RESULTS: Three hundred and twenty-one patients met inclusion criteria: 90 tested positive for xylazine and 231 were negative. The primary outcome occurred in 37 patients, and the secondary outcome occurred in 111 patients. Using multivariable regression analysis, patients positive for xylazine had significantly lower adjusted odds of cardiac arrest (adjusted OR 0.30, 95% CI 0.10-0.92) and coma (adjusted OR 0.52, 95% CI 0.29-0.94). CONCLUSIONS: In this large multicenter cohort, cardiac arrest and coma in emergency department patients with illicit opioid overdose were significantly less severe in those testing positive for xylazine.

3. Diagnosis (Berl). 2023 Apr 5. doi: 10.1515/dx-2023-0005. Online ahead of print.
Ample room for cognitive bias in diagnosing accidental hypothermia.
Blasco Mariño R(1)(2), Roy S(3)(4), Martin Orejas M(1), Soteras Martínez I(2)(5)(6), Paal P(7).
NO ABSTRACT AVAILABLE

4. Europace. 2023 Mar 30;25(3):948-955. doi: 10.1093/europace/euac264.
Right ventricular epicardial arrhythmogenic substrate in long-QT syndrome patients at risk of sudden death.
Pappone C(1)(2)(3), Ciconte G(1)(3), Anastasia L(1)(2)(3), Gaita F(4), Grant E(3)(5), Micaglio E(1)(3), Locati ET(1), Calovic Z(1), Vicedomini G(1)(3), Santinelli V(1).
ABSTRACT
AIMS: The long-QT syndrome (LQTS) represents a leading cause of sudden cardiac death (SCD). The aim of this study was to assess the presence of an underlying electroanatomical arrhythmogenic substrate in high-risk LQTS patients. METHODS AND RESULTS: The present study enrolled 11 consecutive LQTS patients who had experienced frequent implantable cardioverter-defibrillator (ICD discharges triggered by ventricular fibrillation (VF). We acquired electroanatomical biventricular maps of both endo and epicardial regions for all patients and analyzed electrograms sampled from several myocardial regions. Abnormal electrical activities were targeted and eliminated by the means of radiofrequency catheter ablation. VF episodes caused a median of four ICD discharges in eleven patients (6 male, 54.5%; mean age 44.0 ± 7.8 years, range 22-53) prior to our mapping and ablation procedures. The average QTc interval was 500.0 ± 30.2 ms. Endo-epicardial biventricular maps displayed abnormally fragmented, low-voltage (0.9 ± 0.2 mV) and prolonged electrograms (89.9 ± 24.1 ms) exclusively localized in the right ventricular epicardium. We found electrical abnormalities extending over a mean epicardial area of 15.7 ± 3.1 cm2. Catheter ablation of the abnormal epicardial area completely suppressed malignant arrhythmias over a mean 12 months of follow-up (median VF episodes before vs. after ablation, 4 vs. 0; P = 0.003). After the procedure, the QTc interval measured in a 12-lead ECG analysis shortened to a mean of 461.8 ± 23.6 ms (P = 0.004). CONCLUSION: This study reveals that, among high-risk LQTS patients, regions localized in the epicardium of the right ventricle harbour structural electrophysiological abnormalities. Elimination of these abnormal electrical activities successfully prevented malignant ventricular arrhythmia recurrences.

5. Resuscitation. 2023 Apr 3:109785. doi: 10.1016/j.resuscitation.2023.109785. Online ahead of print.

Diagnostic Yield, Safety, and Outcomes of Head-to-Pelvis Sudden Death CT Imaging in Post Arrest Care: The CT FIRST Cohort Study.

R H Branch K(1), Gatewood MO(2), Kudenchuk PJ(3), Maynard C(4), Sayre MR(2), Carlbom DJ(5), Edwards RM(6), Counts CR(2), Probstfield JL(3), Brusen R(7), Johnson N(2), Gunn ML(8).

ABSTRACT

AIM: Our aim was to test whether a head-to-pelvis CT scan improves diagnostic yield and speed to identify causes for out of hospital circulatory arrest (OHCA). METHODS: CT FIRST was a prospective observational pre-/post-cohort study of patients successfully resuscitated from OHCA. Inclusion criteria included unknown cause for arrest, age>18 years, stability to undergo CT, and no known cardiomyopathy or obstructive coronary artery disease. A head-to-pelvis sudden death CT (SDCT) scan within 6 hours of hospital arrival was added to the standard of care for patients resuscitated from OHCA (post-cohort) and compared to standard of care (SOC) alone (pre-cohort). The primary outcome was SDCT diagnostic yield. Secondary outcomes included time to identifying OHCA cause and time-critical diagnoses, SDCT safety, and survival to hospital discharge. RESULTS: Baseline characteristics between the SDCT (N=104) and the SOC (N=143) cohorts were similar. CT scans (either head, chest, and/or abdomen) were ordered in 74 (52%) of SOC patients. Adding SDCT scanning identified 92% of causes for arrest compared to 75% (SOC-cohort; p value <0.001) and reduced the time to diagnosis by 78% (SDCT 3.1 hours, SOC alone 14.1 hours, p <0.0001). Identification of critical diagnoses was similar between cohorts, but SDCT reduced delayed (>6 hours) identification of critical diagnoses by 81% (p<0.001). SDCT safety endpoints were similar including acute kidney injury. Patient survival to discharge was similar between cohorts. DISCUSSION: SDCT scanning early after OHCA resuscitation safely improved the efficiency and diagnostic yield for causes of arrest compared to the standard of care alone.

6. Am J Cardiol. 2023 Apr 15;193:34-36. doi: 10.1016/j.amjcard.2023.02.001. Epub 2023 Mar 1.

Sudden Cardiac Death in Patients With Mitral Valve Prolapse in US (1999-2020).

Zuin M(1), Rigatelli G(2), Bilato C(3).

ABSTRACT

Data regarding the mortality rate in patients with mitral valve prolapse (MVP) experiencing sudden cardiac death (SCD) remains scant. To further elucidate this issue in the US population, we analyzed the death records provided in the publicly available Multiple Cause of Death Dataset of the Centers for Disease Control and Prevention WONDER (Wide-Ranging Online Data for Epidemiological Research) between 1999 and 2020. In this cohort study, 824 US subjects with MVP died from SCD between 1999 and 2020, representing about the 0.3% of all SCDs. The higher mortality rate was observed among women aged <44 years, of White ethnicity, living in urban areas. In conclusion, although the mortality rate of SCD in patients with MVP remains low among the general population, the identification of demographic features and risk factors for SCD may enable strategies for the risk stratification of MVP.

END-TIDAL CO$_2$

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

1. Scand J Trauma Resusc Emerg Med. 2023 Mar 30;31(1):14. doi: 10.1186/s13049-023-01079-9.
Impact of the route of adrenaline administration in patients suffering from out-of-hospital cardiac arrest on 30-day survival with good neurological outcome (ETIVIO study).
Monaco T(1), Fischer M(2), Michael M(1), Hubar I(1), Westenfeld R(3), Rauch S(2), Gräsner JT(4), Bernhard M(5).
ABSTRACT
BACKGROUND: Over the past decades, international guidelines for cardiopulmonary resuscitation (CPR) have changed the recommendation for alternative routes for drug administration. Until now, evidence for the substantial superiority of one route with respect to treatment outcome after CPR has been lacking. The present study compares the effects of intravenous (IV), intraosseous (IO) and endotracheal (ET) adrenaline application during CPR in out-of-hospital cardiac arrest (OHCA) on clinical outcomes within the database of the German Resuscitation Registry (GRR). METHODS: This registry analysis was based on the GRR cohort of 212,228 OHCA patients between 1989 and 2020. Inclusion criteria were: OHCA, application of adrenaline, and out-of-hospital CPR. Excluded from the study were patients younger than 18 years, those who had trauma or bleeding as suspected causes of cardiac arrest, and incomplete data sets. The clinical endpoint was hospital discharge with good neurological outcome [cerebral performance category (CPC) 1/2]. Four routes of adrenaline administration were compared: IV, IO, IO + IV, ET + IV. Group comparisons were done using matched-pair analysis and binary logistic regression. RESULTS: In matched-pair group comparisons of the primary clinical outcome hospital discharge with CPC 1/2, the IV group (n = 2416) showed better results compared to IO (n = 1208), [odds ratio (OR): 2.43, 95% confidence interval (CI): 1.54-3.84, $p < 0.01$] and when comparing IV (n = 8706) to IO + IV (n = 4353), [OR: 1.33, 95% CI: 1.12-1.59, $p < 0.01$]. In contrast, no significant difference was found between IV (n = 532) and ET + IV (n = 266), [OR: 1.26, 95% CI: 0.55-2.90, p = 0.59]. Concurrently, binary logistic regression yielded a highly significant effect of vascular access type (χ^2 = 67.744(3), $p < 0.001$) on hospital discharge with CPC1/2, with negative effects for IO (regression coefficient (r.c.) = - 0.766, p = 0.001) and IO + IV (r.c. = - 0.201, p = 0,028) and no significant effect for ET + IV (r.c. = 0.117, p = 0.770) compared to IV. CONCLUSIONS: The GRR data, collected over a period of 31 years, seem to emphasize the relevance of an IV access during out-of-hospital CPR, in the event that adrenaline had to be administered. IO administration of adrenaline might be less effective. ET application, though removed in 2010 from international guidelines, could gain importance as an alternative route again.

2. Resusc Plus. 2023 Mar 27;14:100379. doi: 10.1016/j.resplu.2023.100379. eCollection 2023 Jun.
Calcium during cardiac arrest: A systematic review.
Hsu CH(1), Couper K(2), Nix T(3), Drennan I(4), Reynolds J(5), Kleinman M(6), Berg KM(7); Advanced Life Support and Paediatric Life Support Task Forces at the International Liaison Committee on Resuscitation (ILCOR).
ABSTRACT

AIM: To perform a systematic review of administration of calcium compared to no calcium during cardiac arrest. METHODS: The search included Medline (PubMed), Embase, Cochrane, Web of Science, and CINAHL Plus and was conducted on September 30, 2022. The population included adults and children in any setting with cardiac arrest. The outcomes included return of spontaneous circulation, survival, survival with favourable neurologic outcome to hospital discharge and 30 days or longer, and quality of life outcome. Cochrane Risk of Bias 2 and ROBINS-I were performed to assess risk of bias for controlled and observational studies, respectively. RESULTS: The systematic review identified 4 studies on 3 randomised controlled trials on 554 adult out-of-hospital cardiac arrest (OHCA) patients, 8 observational studies on 2,731 adult cardiac arrest patients, and 3 observational studies on 17,449 paediatric in-hospital cardiac arrest (IHCA) patients. The randomised controlled and observational studies showed that routine calcium administration during cardiac arrest did not improve the outcome of adult OHCA or IHCA or paediatric IHCA. The risk of bias for the adult trials was low for one recent trial and high for two earlier trials, with randomization as the primary source of bias. The risk of bias for the individual observational studies was assessed to be critical due to confounding. The certainty of evidence was assessed to be moderate for adult OHCA and low for adult and paediatric IHCA. Heterogeneity across studies precluded any meaningful meta-analyses. CONCLUSIONS: This systematic review found no evidence that routine calcium administration improves the outcomes of cardiac arrest in adults or children.

TRAUMA

No articles identified.

VENTILATION

1. Am J Emerg Med. 2023 Mar 29;68:161-169. doi: 10.1016/j.ajem.2023.03.049. Online ahead of print.
Advanced airway management for pediatric out-of-hospital cardiac arrest: A systematic review and network meta-analysis.
Amagasa S(1), Utsumi S(2), Moriwaki T(3), Yasuda H(4), Kashiura M(4), Uematsu S(3), Kubota M(5).
ABSTRACT
OBJECTIVES: Although airway management is important in pediatric resuscitation, the effectiveness of bag-mask ventilation (BMV) and advanced airway management (AAM), such as endotracheal intubation (ETI) and supraglottic airway (SGA) devices, for prehospital resuscitation of pediatric out-of-hospital cardiac arrest (OHCA) remains unclear. We aimed to determine the efficacy of AAM during prehospital resuscitation of pediatric OHCA cases. METHODS: We searched four databases from their inception to November 2022 and included randomized controlled trials and observational studies with appropriate adjustments for confounders that evaluated prehospital AAM for OHCA in children aged <18 years in quantitative synthesis. We compared three interventions (BMV, ETI, and SGA) via network meta-analysis using the GRADE Working Group approach. The outcome measures were survival and favorable neurological outcomes at hospital discharge or 1 month after cardiac arrest. RESULTS: Five studies (including one clinical trial and four cohort studies with rigorous confounding adjustment) involving 4852 patients were analyzed in our quantitative synthesis. Compared with ETI, BMV was associated with survival (relative risk [RR] 0.44 [95% confidence intervals (CI) 0.25-0.77]) (very low certainty). There were no significant association with survival in the other comparisons (SGA vs. BMV: RR 0.62 [95% CI 0.33-1.15] [low certainty], ETI vs. SGA: RR 0.71 [95% CI 0.39-1.32] [very low certainty]). There was no significant association with favorable neurological outcomes in any comparison (ETI vs. BMV: RR 0.33 [95% CI 0.11-1.02]; SGA vs. BMV: RR 0.50 [95% CI 0.14-1.80]; ETI vs. SGA: RR 0.66 [95% CI 0.18-2.46]) (all very low certainty). In the

ranking analysis, the hierarches for efficacy for survival and favorable neurological outcome were BMV > SGA > ETI. CONCLUSION: Although the available evidence is from observational studies and its certainty is low to very low, prehospital AAM for pediatric OHCA did not improve outcomes.

Impedance-based Ventilation Detection and Signal Quality Control during Out-of-Hospital Cardiopulmonary Resuscitation.
Jaureguibeitia X, Aramendi E, Wang HE, Idris AH.
ABSTRACT
Feedback on ventilation could help improve cardiopulmonary resuscitation quality and survival from out-of-hospital cardiac arrest (OHCA). However, current technology that monitors ventilation during OHCA is very limited. Thoracic impedance (TI) is sensitive to air volume changes in the lungs, allowing ventilations to be identified, but is affected by artifacts due to chest compressions and electrode motion. This study introduces a novel algorithm to identify ventilations in TI during continuous chest compressions in OHCA. Data from 367 OHCA patients were included, and 2551 one-minute TI segments were extracted. Concurrent capnography data were used to annotate 20724 ground truth ventilations for training and evaluation. A three-step procedure was applied to each TI segment: First, bidirectional static and adaptive filters were applied to remove compression artifacts. Then, fluctuations potentially due to ventilations were located and characterized. Finally, a recurrent neural network was used to discriminate ventilations from other spurious fluctuations. A quality control stage was also developed to anticipate segments where ventilation detection could be compromised. The algorithm was trained and tested using 5-fold cross-validation, and outperformed previous solutions in the literature on the study dataset. The median (interquartile range, IQR) persegment and per-patient F1-scores were 89.1 (70.8-99.6) and 84.1 (69.0-93.9), respectively. The quality control stage identified most low performance segments. For the 50% of segments with highest quality scores, the median per-segment and per-patient F1-scores were 100.0 (90.9-100.0) and 94.3 (86.5-97.8). The proposed algorithm could allow reliable, quality-conditioned feedback on ventilation in the challenging scenario of continuous manual CPR in OHCA.

CERERBRAL MONITORING

External validation of the PROLOGUE score to predict neurological outcome in adult patients after cardiac arrest: a prospective cohort study.
Blatter R(#)(1), Gökduman B(#)(1), Amacher SA(#)(1)(2)(3), Becker C(1)(3), Beck K(1), Gross S(1), Tisljar K(2), Sutter R(2)(4), Pargger H(2)(4), Marsch S(2)(4), Hunziker S(5)(6).
ABSTRACT
BACKGROUND: The PROLOGUE score (PROgnostication using LOGistic regression model for Unselected adult cardiac arrest patients in the Early stages) is a novel prognostic model for the prediction of neurological outcome after cardiac arrest, which showed exceptional performance in the internal validation. The aim of this study is to validate the PROLOGUE score in an independent cohort of unselected adult cardiac arrest patients and to compare it to the thoroughly validated Out-of-Hospital Cardiac Arrest (OHCA) and Cardiac Arrest Hospital Prognosis (CAHP) scores. METHODS: This study included consecutive adult cardiac arrest patients admitted to the intensive care unit (ICU) of a Swiss tertiary teaching hospital between October 2012 and July 2022. The primary endpoint was poor neurological outcome at hospital discharge, defined as a Cerebral Performance Category (CPC) score of 3 to 5 including death. RESULTS: Of 687 patients included in the analysis, 321 (46.7%) survived to hospital discharge with good neurological outcome, 68 (9.9%) survived with poor

neurological outcome and 298 (43.4%) died. The PROLOGUE score showed an area under the receiver operating characteristic curve (AUROC) of 0.83 (95% CI 0.80 to 0.86) and good calibration for the prediction of the primary outcome. The OHCA and CAHP score showed similar performance (AUROC 0.83 and 0.84 respectively), the differences between the three scores were not significant (p = 0.495). In a subgroup analysis, the PROLOGUE score performed equally in out-of-hospital and in-hospital cardiac arrest patients whereas the OHCA and CAHP score performed significantly better in OHCA patients. CONCLUSION: The PROLOGUE score showed good prognostic accuracy for the early prediction of neurological outcome in adult cardiac arrest survivors in our cohort and might support early goals-of-care discussions in the ICU. Trial registration Not applicable.

2. Resuscitation. 2023 Apr 4:109790. doi: 10.1016/j.resuscitation.2023.109790. Online ahead of print.

Delayed neurologic improvement and long-term survival of patients with poor neurologic status after out-of-hospital cardiac arrest: a retrospective cohort study in Japan.

Hayamizu M(1), Kodate A(2), Sageshima H(2), Tsuchida T(3), Honma Y(1), Mizugaki A(1), Yoshida T(1), Saito T(1), Katabami K(1), Wada T(1), Maekawa K(1), Hayakawa M(4).

ABSTRACT

AIM: To assess survival duration and frequency of delayed neurologic improvement in patients with poor neurologic status at discharge from emergency hospitals after out-of-hospital cardiac arrest (OHCA). METHODS: This retrospective cohort study included OHCA patients admitted to two tertiary emergency hospitals in Japan between January 2014 and December 2020. Pre-hospital, tertiary emergency hospital, and post-acute care hospital data, were retrospectively collected by reviewing medical records. Neurologic improvements were defined as an improvement of Cerebral Performance Category (CPC) scores from 3 or 4 at hospital discharge to 1 or 2. The primary outcome was neurologic improvement after discharge, while the secondary outcome was survival time after cardiac arrest. RESULTS: Of all patients (n=1,012) admitted to tertiary emergency hospitals after OHCA during the observation period, 239 with CPC 3 or 4 at discharge were included, and all were Japanese. Median age was 75 years, 64% were male, and 31% had initially shockable rhythms. Neurologic improvements were observed in nine patients (3.6%), higher in CPC 3 (31%) than CPC 4 (1.3%) patients, but not after 6 months from cardiac arrest. The median survival time after cardiac arrest was 386 days (95% confidence interval: 303-469). CONCLUSION: Survival probability in patients with CPC 3 or 4 was 50% at 1-year and 20% at 3-year. Neurologic improvements were observed in 3.6% patients, higher in CPC 3 than in CPC 4 patients. During the first 6 months after OHCA, the neurologic status may improve in patients with CPC 3 or 4.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Intern Emerg Med. 2023 Apr 4. doi: 10.1007/s11739-023-03251-6. Online ahead of print.

Are smart glasses feasible for dispatch prehospital assistance during on-boat cardiac arrest? A pilot simulation study with fishermen.

Barcala-Furelos R(1)(2), Aranda-García S(3)(4), Otero-Agra M(1)(5), Fernández-Méndez F(1)(2)(6)(5), Alonso-Calvete A(1)(7), Martínez-Isasi S(2)(6)(8), Greif R(9)(10), Rodríguez-Núñez A(2)(6)(8)(11).

ABSTRACT

The aim of the study was to explore feasibility of basic life support (BLS) guided through smart glasses (SGs) when assisting fishermen bystanders. Twelve participants assisted a simulated out-of-hospital cardiac arrest on a fishing boat assisted by the dispatcher through the SGs. The SGs were connected to make video calls. Feasibility was assessed whether or not they needed help from the dispatcher. BLS-AED steps, time to first shock/compression, and CPR's quality (hands-only) during 2 consecutive minutes (1st minute without dispatcher feedback, 2nd with dispatcher feedback) were analyzed. Reliability was analyzed by comparing the assessment of variables performed by the dispatcher through SGs with those registered by an on-scene instructor. Assistance through SGs was needed in 72% of the BLS steps, which enabled all participants to perform the ABC approach and use AED correctly. Feasibility was proven that dispatcher's feedback through SGs helped to improve bystanders' performance, as after dispatcher gave feedback via SGs, only 3% of skills were incorrect. Comparison of on-scene instructor vs. SGs assessment by dispatcher differ in 8% of the analyzed skills: greatest difference in the "incorrect hand position during CPR" (on-scene: 33% vs. dispatcher: 0%). When comparing the 1st minute with 2nd minute, there were only significant differences in the percentage of compressions with correct depth (1st:48 ± 42%, 2nd:70 ± 31, p = 0.02). Using SGs in aquatic settings is feasible and improves BLS. CPR quality markers were similar with and without SG. These devices have great potential for communication between dispatchers and laypersons but need more development to be used in real emergencies.

Content validation of the HeartRunner questionnaire to volunteer responders dispatched to out-of-hospital cardiac arrests: A qualitative study.
Brautsch LAS(1), Zinckernagel L(2), Kragh AMR(3), Hansen CM(3), Kristensen ALS(1), Andersen S(1).
ABSTRACT
AIM: To increase survival after out-of-hospital cardiac arrest (OHCA) in Denmark, volunteer responders are activated through a smartphone application (HeartRunner app) to quickly locate an automated external defibrillator (AED) and assist with cardiopulmonary resuscitation (CPR). All dispatched volunteer responders who have been activated by the app receive a follow-up questionnaire to evaluate their participation in the programme. The content of the questionnaire has never been thoroughly evaluated. We therefore aimed to validate the content of the questionnaire. METHODS: Content validity was evaluated qualitatively. It was based on individual interviews with three experts, along with three focus group interviews and five individual interviews using cognitive interview technique, with a total of 19 volunteer responders. The interviews were also used to inform refinements of the questionnaire to reach improvements in content validity. RESULTS: The initial questionnaire consisted of 23 items. After the content validation process, the questionnaire consisted of 32 items; with the addition of 9 new items. Specifically, some original items were merged into one item or divided into separate items. Moreover, we revised the order of items, some sentences were rephrased or reworded, an introduction and headlines to different sections were added, and skip logic were incorporated to hide non-relevant items. CONCLUSION: Our findings support the importance of validating questionnaires to ensure accuracy of survey instruments. Validation led to modifications of the questionnaire, and we propose a new version of the HeartRunner questionnaire. Our findings support the content validity of the final HeartRunner questionnaire. The questionnaire may allow the collection of quality data to evaluate and improve volunteer responder programmes.

More than 302 million people reached and over 2,200,000 trained in cardiopulmonary resuscitation worldwide: The 2021 ILCOR World Restart a Heart initiative.

Tiwari L(1)(2), Lockey A(3), Böttiger BW(4), Rott N(5), Hoover AV(6), Chakra Rao S(7)(2), Garg R(8)(2), Edara LR(9)(2); ILCOR WRAH collaborators.

ABSTRACT

Immediate bystander CPR after an out-of-hospital-cardiac arrest is likely to save hundreds of thousands of lives worldwide each year. International Liaison Committee on Resuscitation launched the World Restart a Heart initiative on October 16, 2018. In 2021 more than 2,200,000 persons were trained and at least 302,000,000 people were reached by WRAH global collaboration through print and digital media making it the highest-impact year since its inception. We strive for real success when CPR training and awareness become a year-round activity in all countries and all the citizens of the world realize that "Two Hands Can Save a Life!"

Potential to enhance telephone cardiopulmonary resuscitation with improved instructions - findings from a simulation-based manikin study with lay rescuers.

Hölzing CR(1), Brinkrolf P(2), Metelmann C(2), Metelmann B(2), Hahnenkamp K(2), Baumgarten M(2).

ABSTRACT

BACKGROUND: Telephone-Cardiopulmonary Resuscitation (T-CPR) significantly increases rate of bystander resuscitation and improves patient outcomes after out-of-hospital cardiac arrest (OHCA). Nevertheless, securing correct execution of instructions remains a difficulty. ERC Guidelines 2021 recommend standardised instructions with continuous evaluation. Yet, there are no explicit recommendations on a standardised wording of T-CPR in the German language. We investigated, whether a modified wording regarding check for breathing in a German T-CPR protocol improved performance of T-CPR. METHODS: A simulation study with 48 OHCA scenarios was conducted. In a non-randomised trial study lay rescuers were instructed using the real-life-CPR protocol of the regional dispatch centre and as the intervention a modified T-CPR protocol, including specific check for breathing (head tilt-chin lift instructions). Resuscitation parameters were assessed with a manikin and video recordings. RESULTS: Check for breathing was performed by 64.3% (n = 14) of the lay rescuers with original wording and by 92.6% (n = 27) in the group with modified wording (p = 0.035). In the original wording group the head tilt-chin manoeuvre was executed by 0.0% of the lay rescuers compared to 70.3% in the group with modified wording (p < 0.001). The average duration of check for breathing was 1 ± 1 s in the original wording group and 4 ± 2 s in the group with modified wording (p < 0.001). Other instructions (e.g. check for consciousness and removal of clothing) were well performed and did not differ significantly between groups. Quality of chest compression did not differ significantly between groups, with the exception of mean chest compression depth, which was slightly deeper in the modified wording group. CONCLUSION: Correct check for breathing seems to be a problem for lay rescuers, which can be decreased by describing the assessment in more detail. Hence, T-CPR protocols should provide standardised explicit instructions on how to perform airway assessment. Each protocol should be evaluated for practicability.

The Effectiveness of Online-Only Blended Cardiopulmonary Resuscitation Training: Static-Group Comparison Study.

Chong KM(#)(1), Yang HW(#)(2), He HC(3), Lien WC(1), Yang MF(1), Chi CY(1), Chen YP(1), Huang CH(1), Ko PC(1).

ABSTRACT

BACKGROUND: Basic life support (BLS) education is essential for improving bystander cardiopulmonary resuscitation (CPR) rates, but the imparting of such education faces obstacles

during the outbreak of emerging infectious diseases, such as COVID-19. When face-to-face teaching is limited, distance learning-blended learning (BL) or an online-only model-is encouraged. However, evidence regarding the effect of online-only CPR training is scarce, and comparative studies on classroom-based BL (CBL) are lacking. While other strategies have recommended self-directed learning and deliberate practice to enhance CPR education, no previous studies have incorporated all of these instructional methods into a BLS course. OBJECTIVE: This study aimed to demonstrate a novel BLS training model-remote practice BL (RBL)-and compare its educational outcomes with those of the conventional CBL model. METHODS: A static-group comparison study was conducted. It included RBL and CBL courses that shared the same paradigm, comprising online lectures, a deliberate practice session with Little Anne quality CPR (QCPR) manikin feedback, and a final assessment session. In the main intervention, the RBL group was required to perform distant self-directed deliberate practice and complete the final assessment via an online video conference. Manikin-rated CPR scores were measured as the primary outcome; the number of retakes of the final examination was the secondary outcome. RESULTS: A total of 52 and 104 participants from the RBL and CBL groups, respectively, were eligible for data analysis. A comparison of the 2 groups revealed that there were more women in the RBL group than the CBL group (36/52, 69.2% vs 51/104, 49%, respectively; P=.02). After adjustment, there were no significant differences in scores for QCPR release (96.9 vs 96.4, respectively; P=.61), QCPR depth (99.2 vs 99.5, respectively; P=.27), or QCPR rate (94.9 vs 95.5, respectively; P=.83). The RBL group spent more days practicing before the final assessment (12.4 vs 8.9 days, respectively; P<.001) and also had a higher number of retakes (1.4 vs 1.1 times, respectively; P<.001). CONCLUSIONS: We developed a remote practice BL-based method for online-only distant BLS CPR training. In terms of CPR performance, using remote self-directed deliberate practice was not inferior to the conventional classroom-based instructor-led method, although it tended to take more time to achieve the same effect.

Developing a Decision Pathway for Family Presence During Resuscitation.

Tennyson CD, Oliver JP, Jooste KR.

ABSTRACT

BACKGROUND: The standard of care for family presence during resuscitation (FPDR) is evolving, and leading organizations collectively recommend establishing institutional policy for its practice. Although FPDR is supported at this single institution, the process was not standardized. METHODS: An interprofessional group authored a decision pathway to standardize the care of families during inpatient code blue events at one institution. The pathway was reviewed and applied in code blue simulation events to highlight the role of the family facilitator and the importance of inter-professional teamwork skills. RESULTS: The decision pathway is a patient-centered algorithm that promotes safety and family autonomy. Pathway recommendations are shaped by current literature, expert consensus, and existing institutional regulations. An on-call chaplain responds to all code blue events as the family facilitator and conducts assessments and decision making per the pathway. Clinical considerations include patient prioritization, family safety, sterility, and team consensus. One year after implementation, staff felt that it positively affected patient and family care. The frequency of inpatient FPDR did not increase after implementation. CONCLUSION: As a result of the decision pathway implementation, FPDR is consistently a safe and coordinated option for patients' family members

Neuroprognostication in the Post Cardiac Arrest Patient: A Canadian Cardiovascular Society Position Statement.

Primary Panel; Fordyce CB(1), Kramer AH(2), Ainsworth C(3), Christenson J(4), Hunter G(5), Kromm J(2), Lopez Soto C(6), Scales DC(7), Sekhon M(8), van Diepen S(9), Dragoi L(7), Josephson C(2), Kutsogiannis J(10), Le May MR(11), Overgaard CB(12), Savard M(13), Schnell G(14), Wong GC(15), Belley-Côté E(3); Secondary Panel; Fantaneanu TA(16), Granger CB(17), Luk A(18), Mathew R(19), McCredie V(20), Murphy L(21), Teitelbaum J(22).

ABSTRACT

Cardiac arrest (CA) is associated with a low rate of survival with favourable neurologic recovery. The most common mechanism of death after successful resuscitation from CA is withdrawal of life-sustaining measures on the basis of perceived poor neurologic prognosis due to underlying hypoxic-ischemic brain injury. Neuroprognostication is an important component of the care pathway for CA patients admitted to hospital but is complex, challenging, and often guided by limited evidence. Using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system to evaluate the evidence underlying factors or diagnostic modalities available to determine prognosis, recommendations were generated in the following domains: (1) circumstances immediately after CA; (2) focused neurologic exam; (3) myoclonus and seizures; (4) serum biomarkers; (5) neuroimaging; (6) neurophysiologic testing; and (7) multimodal neuro-prognostication. This position statement aims to serve as a practical guide to enhance in-hospital care of CA patients and emphasizes the adoption of a systematic, multimodal approach to neuroprognostication. It also highlights evidence gaps.

Cost-Savings of Do-not-Resuscitate Orders Among Elderly Patients With Heart Failure in the United States.
Callahan K(1), Van Scoy LJ(2), Kitko L(3), Acharya Y(1), Hardy MA(4), Hollenbeak CS(1).

ABSTRACT

Do-not-resuscitate (DNR) orders should preclude the use of cardiopulmonary resuscitation and may be associated with patient outcomes for patients hospitalized with heart failure (HF). This study examined the association between DNR and costs, mortality, and length of stay. The study cohort was a national sample of 700 922 hospital admissions of patients aged >65 with a primary diagnosis of HF. Elderly HF patients who died with a DNR had cost-savings of $5640 (P < 0.001). Patients with a DNR order were 8.9% points more likely to die before discharge than patients without (P < 0.001), and patients who died with a DNR had a significantly shorter hospital stay by 1.51 days (P < 0.001). DNR orders among elderly patients with HF are associated with cost-savings, as well as a higher mortality and shorter length of stay. In addition to primary benefits, advance care planning may aid in containing costs of care at end of life for HF.

Predictive value of a tiered escalation response system: A case control study.
O'Connell A(1), Flabouris A(2), Edwards S(3), Tang D(4), Lavrencic K(4), Brook E(5), Shih-Teng Kao S(6), Thompson C(2).

ABSTRACT

OBJECTIVE: Rapid response systems designed to detect and respond to clinical deterioration often incorporate a multitiered, escalation response. We sought to determine the 'predictive strength' of commonly used triggers, and tiers of escalation, for predicting a rapid response team (RRT) call, unanticipated intensive care unit admission, or cardiac arrest (events). DESIGN: This was a nested, matched case-control study. SETTING: The study setting involved a tertiary referral hospital. PARTICIPANTS: Cases experienced an event, and controls were matched patients without an event.

OUTCOME MEASURES: Sensitivity and specificity and area under the receiver operating characteristic curve (AUC) were measured. Logistic regression determined the set of triggers with the highest AUC. RESULTS: There were 321 cases and 321 controls. Nurse triggers occurred in 62%, medical review triggers in 34%, and RRT triggers 20%. Positive predictive value of nurse triggers was 59%, that of medical review triggers was 75%, and that of RRT triggers was 88%. These values were no different when modifications to triggers were considered. The AUC was 0.61 for nurses, 0.67 for medical review, and 0.65 for RRT triggers. With modelling, the AUC was 0.63 for the lowest tier, 0.71 for next highest, and 0.73 for the highest tier. CONCLUSION: For a three-tiered system, at the lowest tier, specificity of triggers decreases, sensitivity increases, but the discriminatory power is poor. Thus, there is little to be gained by using a rapid response system with more than two tiers. Modifications to triggers reduced the potential number of escalations and did not affect tier discriminatory value.

POST-CARDIAC ARREST TREATMENTS

Explainable artificial intelligence-based prediction of poor neurological outcome from head computed tomography in the immediate post-resuscitation phase.
Kawai Y(1), Kogeichi Y(2), Yamamoto K(2), Miyazaki K(2), Asai H(2), Fukushima H(2).
ABSTRACT
Predicting poor neurological outcomes after resuscitation is important for planning treatment strategies. We constructed an explainable artificial intelligence-based prognostic model using head computed tomography (CT) scans taken immediately within 3 h of resuscitation from cardiac arrest and compared its predictive accuracy with that of previous methods using gray-to-white matter ratio (GWR). We included 321 consecutive patients admitted to our institution after resuscitation for out-of-hospital cardiopulmonary arrest with circulation resumption over 6 years. A machine learning model using head CT images with transfer learning was used to predict the neurological outcomes at 1 month. These predictions were compared with the predictions of GWR for multiple regions of interest in head CT using receiver operating characteristic (ROC)-area under curve (AUC) and precision recall (PR)-AUC. The regions of focus were visualized using a heatmap. Both methods had similar ROC-AUCs, but the machine learning model had a higher PR-AUC (0.73 vs. 0.58). The machine learning-focused area of interest for classification was the boundary between gray and white matter, which overlapped with the area of focus when diagnosing hypoxic- ischemic brain injury. The machine learning model for predicting poor outcomes had superior accuracy to conventional methods and could help optimize treatment.

The prevalence of anxiety and depression in cardiac arrest survivors: A systematic review and meta-analysis.
Chen X(1), Li D(1), He L(2), Yang W(3), Dai M(1), Lan L(1), Diao D(1), Zou L(1), Yao P(1), Cao Y(4).
ABSTRACT
OBJECTIVE: This systematic review aimed to identify the prevalence of anxiety and depression in cardiac arrest (CA) survivors. METHODS: A systematic review and network meta-analysis was performed on observational studies in adult cardiac arrest survivors with psychiatric disorders from PubMed, Embase, Cochrane Library and Web of Science. In the meta-analysis, we combined the prevalence quantitatively and analyzed the subgroup based on the classification indexes. RESULTS: We identified 32 articles that met the inclusion criteria. Regarding anxiety,the pooled prevalence was 24% (95% CI, 17-31%) and 22% (95% CI, 13-26%) in short-term and long-term respectively. The subgroup analysis showed that the pooled incidence in in-hospital cardiac arrest (IHCA) and out-of-

hospital cardiac arrests (OHCA) survivors was 14.0% (95%CI, 9.0-20.0%) and 28.0% (95%CI, 20.0-36.0%) for short-term anxiety.The incidence of anxiety measured by, Hamilton Anxiety Rating Scale(HAM-A) and State-Trait Anxiety Inventory(STAI) was higher than other tools(P < 0.01). Regarding depression,the data analysis showed that the pooled incidence of short-term and long-term depression was 19% (95% CI, 13-26%) and 19% (95% CI, 16-25%), respectively. The subgroup analysis showed that the incidence of short-term and long-term depression was 8% (95% CI, 1-19%) and 30% (95% CI, 5-64%) for IHCA survivors, and was 18% (95% CI, 11-26%) and 17% (95% CI, 11-25%) for OHCA survivors. The incidence of depression measured by Hamilton Depression Rating Scale(HDRS) and Symptom check list-90(SCL-90) was higher than other assessment tools(P < 0.01). CONCLUSIONS: The meta-analysis indicated a high prevalence of anxiety and depression in CA survivors, and those symptoms persisted 1 year or more after CA. Evaluation tool is an important factor affecting the measurement results.

Stem Cell Therapy for Ischemic Brain Injury: Early Intranasal Delivery after Cardiac Arrest.
Liu X(1), Jia X(2)(3)(4)(5).
ABSTRACT

Global ischemic brain injury is the leading cause of mortality and long-term disability in patients resuscitated from cardiac arrest. Hypothermia and neuroprotective agents are two strategies partially improve neurological outcomes following resuscitation. However, the therapeutic effects of these treatments are inconsistently reported. Stem cell therapy has emerged as a promising protective strategy due to its potential for proliferation and differentiation into functional neural cells. This editorial reviews the current status of stem cell therapy via the intranasal route in primates and clinical studies, along with the treatment window of stem cell therapy in ischemic brain injury after cardiac arrest to provide new insight into stem cell therapy for cardiac arrest-induced global cerebral ischemia injury.

Prediction of clinical outcomes following return of spontaneous circulation.
Fujii M(1), Nakamura M(1), Imamura T(2).
NO ABSTRACT AVAILABLE

Evaluation of Plasma Xanthine Oxidoreductase (XOR) Activity in Patients with Cardiopulmonary Arrest.
Shibata Y(1), Shirakabe A(1), Okazaki H(1), Matsushita M(1), Shigihara S(1), Nishigoori S(1), Sawatani T(1), Kiuchi K(1), Takahashi M(1), Murase T(2), Nakamura T(3), Kobayashi N(1), Asai K(1).
ABSTRACT

Plasma xanthine oxidoreductase (XOR) activity in patients with cardiopulmonary arrest (CPA) has not yet been studied.A total of 1,158 patients who required intensive care and 231 control patients who attended a cardiovascular outpatient clinic were prospectively analyzed. Blood samples were collected within 15 minutes of admission from patients in intensive care patients, which were divided into a CPA group (n = 1,053) and a no-CPA group (n = 105). Plasma XOR activity was compared between the 3 groups and factors independently associated with extremely elevated XOR activity were identified using a multivariate logistic regression model. Plasma XOR activity in the CPA group (median, 1,030.0 pmol/hour/mL; range, 233.0-4,240.0 pmol/hour/mL) was significantly higher than in the no-CPA group (median, 60.2 pmol/hour/mL; range, 22.5-205.0 pmol/hour/mL) and control group (median, 45.2 pmol/hour/mL; range, 19.3-98.8 pmol/hour/mL). The regression model showed that out-of-hospital cardiac arrest (OHCA) (yes, odds ratio [OR]: 2.548; 95% confidence interval [CI]: 1.098-5.914; P = 0.029) and lactate levels (per 1.0 mmol/L increase, OR: 1.127; 95% CI:

1.031-1.232; P = 0.009) were independently associated with high plasma XOR activity (≥ 1,000 pmol/hour/mL). Kaplan-Meier curve analysis indicated that the prognosis, including all-cause death within 30 days, was significantly poorer in high-XOR patients (XOR ≥ 6,670 pmol/hour/mL) than in the other patients.Plasma XOR activity was extremely high in patients with CPA, especially in OHCA. This would be associated with a high lactate value and expected to eventually lead to adverse outcome in patients with CPA.

Sex Differences in Patient-Reported Outcomes in the Immediate Recovery Period After Resuscitation: Findings From the Cross-sectional DenHeart Survey.
Wagner MK, Christensen AV, Hassager C, Stenbæk DS, Ekholm O, Borregaard B, Thrysoee L, Rasmussen TB, Thorup CB, Mols RE, Juel K, Berg SK.
ABSTRACT
BACKGROUND: A paucity of resuscitation studies have examined sex differences in patient-reported outcomes upon hospital discharge. It remains unclear whether male and female patients differ in health outcomes in their immediate responses to trauma and treatment after resuscitation. OBJECTIVES: The aim of this study was to examine sex differences in patient-reported outcomes in the immediate recovery period after resuscitation. METHODS: In a national cross-sectional survey, patient-reported outcomes were measured by 5 instruments: symptoms of anxiety and depression (Hospital Anxiety and Depression Scale), illness perception (Brief Illness Perception Questionnaire [B-IPQ]), symptom burden (Edmonton Symptom Assessment Scale [ESAS]), quality of life (Heart Quality of Life Questionnaire), and perceived health status (12-Item Short Form Survey). RESULTS: Of 491 eligible survivors of cardiac arrest, 176 (80% male) participated. Compared with male, resuscitated female reported worse symptoms of anxiety (Hospital Anxiety and Depression Scale-Anxiety score ≥8) (43% vs 23%; P = .04), emotional responses (B-IPQ) (mean [SD], 4.9 [3.12] vs 3.7 [2.99]; P = .05), identity (B-IPQ) (mean [SD], 4.3 [3.10] vs 4.0 [2.85]; P = .04), fatigue (ESAS) (mean [SD], 5.26 [2.48] vs 3.92 [2.93]; P = .01), and depressive symptoms (ESAS) (mean [SD], 2.60 [2.68] vs 1.67 [2.19]; P = .05). CONCLUSIONS: Between sexes, female survivors of cardiac arrest reported worse psychological distress and illness perception and higher symptom burden in the immediate recovery period after resuscitation. Attention should focus on early symptom screening at hospital discharge to identify those in need of targeted psychological support and rehabilitation.

TARGETED TEMPERATURE MANAGEMENT

Use of the Arctic Sun™ 5000 targeted temperature management system to achieve rewarming during a prolonged hypothermic cardiorespiratory arrest.
Grewal A(1), Thomas R(1).
ABSTRACT
Cardiorespiratory arrest due to severe hypothermia may require prolonged cardiopulmonary resuscitation whilst the patient is rewarmed. There are reported cases of successful resuscitation with good neurological outcomes after prolonged arrests and resuscitation up to 9 h. However, in the majority of these cases, extracorporeal life support was used to maintain perfusion and rewarm the patient. Here, we report a case of successful cardiopulmonary resuscitation lasting 6.5 h, following cardiac arrest secondary to severe hypothermia, with rewarming using an Arctic Sun™ 5000. The Arctic Sun 5000 is a targeted temperature management device which is conventionally used to prevent hyperthermia post-cardiac arrest. In this report, we discuss the reasons why the

device was used in this case and the effects of severe hypothermia on cardiac arrest management. We believe that this is the longest reported successful cardiopulmonary resuscitation in a severely hypothermic patient without the use of extracorporeal life support.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

Association between the number of prehospital defibrillation attempts and a sustained return of spontaneous circulation: a retrospective, multicentre, registry-based study.
Ko BS(1), Kim YJ(2), Han KS(3), Jo YH(4), Shin J(5), Park I(6), Kang H(1), Lim TH(1), Hwang SO(7), Kim WY(8).
ABSTRACT
BACKGROUND: Currently, there is no consensus on the number of defibrillation attempts that should be made before transfer to a hospital in patients with out-of-hospital cardiac arrest (OHCA). This study aimed to evaluate the association between the number of defibrillations and a sustained prehospital return of spontaneous circulation (ROSC). METHODS: A retrospective analysis of a multicentre, prospectively collected, registry-based study in Republic of Korea was conducted for OHCA patients with prehospital defibrillation. The primary outcome was sustained prehospital ROSC, and the secondary outcome was a good neurological outcome at hospital discharge, defined as Cerebral Performance Category score 1 or 2. Cumulative incidence of sustained prehospital ROSC and good neurological outcome according to number of defibrillations were examined. Multivariable logistic regression analysis was used to examine whether the number of defibrillations was independently associated with the outcomes. RESULTS: Excluding 172 patients with missing data, a total of 1983 OHCA patients who received prehospital defibrillation were included. The median time from arrest to first defibrillation was 10 (IQR 7-15) min. The numbers of patients with sustained prehospital ROSC and good neurological outcome were 738 (37%) and 549 (28%), respectively. Sustained ROSC rates decreased as the number of defibrillation attempts increased from the first to the sixth (16%, 9%, 5%, 3%, 2% and 1%, respectively). The cumulative sustained ROSC rate, and good neurological outcome rate from initial defibrillation to sixth defibrillation were 16%, 25%, 30%, 34%, 36%, 36% and 11%, 18%, 22%, 25%, 26%, 27%, respectively. With adjustment for clinical characteristics and time to defibrillation, a higher number of defibrillations was independently associated with a lower chance of a sustained ROSC (OR 0.81, 95% CI 0.76 to 0.86) and a lower chance of good neurological outcome (OR 0.86, 95% CI 0.80 to 0.92). CONCLUSIONS: We observed no significant increase in ROSC after five defibrillations, and no absolute increase in ROSC after seven defibrillations. These data provide a starting point for determination of the optimal defibrillation strategy prior to consideration for prehospital extracorporeal cardiopulmonary resuscitation (ECPR) or conveyance to a hospital with an ECPR capability.

Accelerometry-based classification of circulatory states during out-of-hospital cardiac arrest.
Kern WJ, Orlob S, Bohn A, Toller W, Wnent J, Grasner JT, Holler M.
ABSTRACT
OBJECTIVE: Exploit accelerometry data for an automatic, reliable, and prompt detection of spontaneous circulation during cardiac arrest, as this is both vital for patient survival and practically challenging. METHODS: We developed a machine learning algorithm to automatically predict the circulatory state during cardiopulmonary resuscitation from 4-second-long snippets of accelerometry and electrocardiogram (ECG) data from pauses of chest compressions of real-world

defibrillator records. The algorithm was trained based on 422 cases from the German Resuscitation Registry, for which ground truth labels were created by a manual annotation of physicians. It uses a kernelized Support Vector Machine classifier based on 49 features, which partially reflect the correlation between accelerometry and electrocardiogram data. RESULTS: Evaluating 50 different test-training data splits, the proposed algorithm exhibits a balanced accuracy of 81.2%, a sensitivity of 80.6%, and a specificity of 81.8%, whereas using only ECG leads to a balanced accuracy of 76.5%, a sensitivity of 80.2%, and a specificity of 72.8%. CONCLUSION: The first method employing accelerometry for pulse/no-pulse decision yields a significant increase in performance compared to single ECG-signal usage. SIGNIFICANCE: This shows that accelerometry provides relevant information for pulse/no-pulse decisions. In application, such an algorithm may be used to simplify retrospective annotation for quality management and, moreover, to support clinicians to assess circulatory state during cardiac arrest treatment.

Epileptiform patterns predicting unfavorable outcome in postanoxic patients: A matter of time?
Misirocchi F(1), Bernabè G(2), Zinno L(3), Spallazzi M(3), Zilioli A(4), Mannini E(4), Lazzari S(4), Tontini V(4), Mutti C(5), Parrino L(6), Picetti E(7), Florindo I(3).
ABSTRACT
OBJECTIVE: Historically, epileptiform malignant EEG patterns (EMPs) have been considered to anticipate an unfavorable outcome, but an increasing amount of evidence suggests that they are not always or invariably associated with poor prognosis. We evaluated the prognostic significance of an EMP onset in two different timeframes in comatose patients after cardiac arrest (CA): early-EMPs and late-EMPs, respectively. METHODS: We included all comatose post-CA survivors admitted to our intensive care unit (ICU) between 2016 and 2018 who underwent at least two 30-minute EEGs, collected at T0 (12-36 h after CA) and T1 (36-72 h after CA). All EEGs recordings were re-analyzed following the 2021 ACNS terminology by two senior EEG specialists, blinded to outcome. Malignant EEGs with abundant sporadic spikes/sharp waves, rhythmic and periodic patterns, or electrographic seizure/status epilepticus, were included in the EMP definition. The primary outcome was the cerebral performance category (CPC) score at 6 months, dichotomized as good (CPC 1-2) or poor (CPC 3-5) outcome. RESULTS: A total of 58 patients and 116 EEG recording were included in the study. Poor outcome was seen in 28 (48%) patients. In contrast to late-EMPs, early-EMPs were associated with a poor outcome (p = 0.037), persisting after multiple regression analysis. Moreover, a multivariate binomial model coupling the timing of EMP onset with other EEG predictors such as T1 reactivity and T1 normal voltage background can predict outcome in the presence of an otherwise non-specific malignant EEG pattern with quite high specificity (82%) and moderate sensitivity (77%). CONCLUSIONS: The prognostic significance of EMPs seems strongly time-dependent and only their early-onset may be associated with an unfavorable outcome. The time of onset of EMP combined with other EEG features could aid in defining prognosis in patients with intermediate EEG patterns.

Improved prediction of sudden cardiac death in patients with heart failure through digital processing of electrocardiography.
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ABSTRACT

AIMS: Available predictive models for sudden cardiac death (SCD) in heart failure (HF) patients remain suboptimal. We assessed whether the electrocardiography (ECG)-based artificial intelligence (AI) could better predict SCD, and also whether the combination of the ECG-AI index and conventional predictors of SCD would improve the SCD stratification among HF patients. METHODS AND RESULTS: In a prospective observational study, 4 tertiary care hospitals in Tokyo enrolled 2559 patients hospitalized for HF who were successfully discharged after acute decompensation. The ECG data during the index hospitalization were extracted from the hospitals' electronic medical record systems. The association of the ECG-AI index and SCD was evaluated with adjustment for left ventricular ejection fraction (LVEF), New York Heart Association (NYHA) class, and competing risk of non-SCD. The ECG-AI index plus classical predictive guidelines (i.e. LVEF ≤35%, NYHA Class II and III) significantly improved the discriminative value of SCD [receiver operating characteristic area under the curve (ROC-AUC), 0.66 vs. 0.59; P = 0.017; Delong's test] with good calibration (P = 0.11; Hosmer-Lemeshow test) and improved net reclassification [36%; 95% confidence interval (CI), 9-64%; P = 0.009]. The Fine-Gray model considering the competing risk of non-SCD demonstrated that the ECG-AI index was independently associated with SCD (adjusted sub-distributional hazard ratio, 1.25; 95% CI, 1.04-1.49; P = 0.015). An increased proportional risk of SCD vs. non-SCD with an increasing ECG-AI index was also observed (low, 16.7%; intermediate, 18.5%; high, 28.7%; P for trend = 0.023). Similar findings were observed in patients aged ≤75 years with a non-ischaemic aetiology and an LVEF of >35%. CONCLUSION: To improve risk stratification of SCD, ECG-based AI may provide additional values in the management of patients with HF.

PEDIATRICS AND CHILDREN

Gamification educational intervention improves pediatric nurses' comfort and speed drawing up code-dose epinephrine.
King CE(1), Kells A(2), Trout L(3), Yirinec A(4), Zhou S(5), Zurca AD(6).
ABSTRACT
PURPOSE: Drawing up weight-based doses of epinephrine is a vital skill for pediatric nurses; however, non-intensive care unit (ICU) nurses may not routinely perform this skill and may not be as efficient or comfortable doing so during pediatric resuscitations. This study aimed to evaluate the impact of a gamification program on non-ICU pediatric nurses' knowledge and skills regarding epinephrine for pediatric cardiac arrest. DESIGN AND METHODS: Comfort and time to draw up three doses of epinephrine during out-of-ICU in-hospital pediatric cardiac arrest were measured pre- and post- a gamification-centered educational intervention. RESULTS: Nursing comfort improved from 2.93 ± 1.90 to 6.68 ± 1.46 out of 10 (mean difference 3.6 +/- 2.1, p < 0.001). Overall time to draw up three doses of epinephrine decreased after the intervention by an average of 27.1 s (p = 0.019). The number of nurses who could complete the task in under 2 min improved from 23% to 59% (p = 0.031). CONCLUSIONS: At baseline few non-ICU nurses could draw up multiple weight-based doses of epinephrine in under two minutes. A gamification simulation-based educational intervention improved pediatric non-ICU nurses' comfort and speed drawing up epinephrine. PRACTICE IMPLICATIONS: Wide-spread implementation of gamification-centered educational initiatives could result in faster epinephrine administration and improved mortality rates from in-hospital pediatric cardiac arrest.

Sudden cardiac death in childhood hypertrophic cardiomyopathy.

Thakkar K(1), Karajgi AR(2), Kallamvalappil AM(3), Avanthika C(4), Jhaveri S(5), Shandilya A(6), Anusheel(7), Al-Masri R(8).

ABSTRACT

The most prevalent cause of mortality in children with hypertrophic cardiomyopathy (HCM) is sudden cardiac death (SCD), which happens more frequently than in adult patients. Risk stratification tactics have generally been drawn from adult practice, however emerging data has revealed significant disparities between children and adult cohorts, implying the need for pediatric-specific risk stratification methodologies. We conducted an all-language literature search on Medline, Cochrane, Embase, and Google Scholar until October 2021. The following search strings and Medical Subject Heading (MeSH) terms were used: "HCM," "SCD," "Sudden Cardiac Death," and "Childhood Onset HCM." We explored the literature on the risk of SCD in HCM for its epidemiology, pathophysiology, the role of various genes and their influence, associated complications leading to SCD and preventive and treatment modalities. Childhood-onset HCM is linked to significant life-long morbidity and mortality, including a higher SCD rate in children than in adults. The present focus is on symptom relief and avoiding illness-related consequences, but the prospect of future disease-modifying medicines offers an intriguing opportunity to alter disease expression and outcomes in these young individuals. Current preventive recommendations promote implantable cardioverter defibrillator placement based on cumulative risk factor thresholds, although they have been demonstrated to have weak discriminating capacity. This article addresses questions and discusses the etiology, risk factors, and method to risk stratification for SCD in children with HCM.

EXTRACORPOREAL LIFE SUPPORT

Extracorporeal Cardiopulmonary Resuscitation in Infants: Outcomes and Predictors of Mortality.
Yoo BA(1), Yoo S(1), Choi ES(1), Kwon BS(1), Park CS(1), Yun TJ(1), Kim DH(1).

ABSTRACT

BACKGROUND: Extracorporeal cardiopulmonary resuscitation (E-CPR) plays an indispensable role when resuscitation fails; however, extracorporeal life support (ECLS) in infants is different from that in adults. The objective of this study was to evaluate the outcomes of E-CPR in infants. METHODS: A single-center retrospective study was conducted, analyzing 51 consecutive patients (age <1 year) who received E-CPR for in-hospital cardiac arrest between 2010 and 2021. RESULTS: The median age and body weight was 51 days (interquartile range [IQR], 17-111 days) and 3.4 kg (IQR, 2.9-5.1 kg), respectively. The cause of arrest was cardiogenic in 45 patients (88.2%), and 48 patients (94.1%) had congenital cardiac anomalies. The median conventional cardiopulmonary resuscitation (C-CPR) time before the initiation of ECLS was 77 minutes (IQR, 61-103 minutes) and duration of ECLS was 7 days (IQR, 3-12 days). There were 36 in-hospital deaths (70.6%), and another patient survived after heart transplantation. In the multivariate analysis, single-ventricular physiology (odds ratio [OR], 5.05; p=0.048), open sternum status (OR, 8.69; p=0.013), and C-CPR time (OR, 1.47 per 10 minutes; p=0.021) were significant predictors of in-hospital mortality. In a receiver operating characteristic curve, the optimal cut-off of C-CPR time was 70.5 minutes. The subgroup with early E-CPR (C-CPR time <70.5 minutes) showed a tendency for lower in-hospital mortality tendency (54.5% vs. 82.8%, p=0.060), albeit not statistically significant. CONCLUSION: If resuscitation fails in an infant, E-CPR could be a life-saving option. It is crucial to improve C-CPR quality and shorten the time before ECLS initiation.

Extracorporeal Cardiopulmonary Resuscitation: Prehospital or In-Hospital Cannulation?

Scquizzato T(1), Hutin A(2), Landoni G(3).
NO ABSTRACT AVAILABLE

EXPERIMENTAL RESEARCH

Thiamine for the Treatment of Cardiac Arrest-Induced Neurological Injury: A Randomized, Blinded, Placebo-Controlled Experimental Study.
Vammen L(1)(2), Johannsen CM(1)(2), Baltsen CD(2), Nørholt C(1)(2), Eggertsen M(1)(2), Mortensen S(2), Vormfenne L(2), Povlsen A(2)(3), Donnino MW(4)(5), Løfgren B(2)(6)(7), Andersen LW(1)(2)(8), Granfeldt A(1)(2).
ABSTRACT
Background Thiamine supplementation has demonstrated protective effects in a mouse model of cardiac arrest. The aim of this study was to investigate the neuroprotective effects of thiamine in a clinically relevant large animal cardiac arrest model. The hypothesis was that thiamine reduces neurological injury evaluated by neuron-specific enolase levels. Methods and Results Pigs underwent myocardial infarction and subsequently 9 minutes of untreated cardiac arrest. Twenty minutes after successful resuscitation, the pigs were randomized to treatment with either thiamine or placebo. All pigs underwent 40 hours of intensive care and were awakened for assessment of functional neurological outcome up until 9 days after cardiac arrest. Nine pigs were included in both groups, with 8 in each group surviving the entire intensive care phase. Mean area under the curve for neuron-specific enolase was similar between groups, with 81.5 µg/L per hour (SD, 20.4) in the thiamine group and 80.5 µg/L per hour (SD, 18.3) in the placebo group, with an absolute difference of 1.0 (95% CI, -57.8 to 59.8; P=0.97). Likewise, there were no absolute difference in neurological deficit score at the end of the protocol (2 [95% CI, -38 to 42]; P=0.93). There was no absolute mean group difference in lactate during the intensive care period (1.1 mmol/L [95% CI, -0.5 to 2.7]; P=0.16). Conclusions In this randomized, blinded, placebo-controlled trial using a pig cardiac arrest model with myocardial infarction and long intensive care and observation for 9 days, thiamine showed no effect in changes to functional neurological outcome or serum levels of neuron-specific enolase. Thiamine treatment had no effect on lactate levels after successful resuscitation.

Respiratory Mechanics and Neural Respiratory Drive of Untreated Gasping During Cardiac Arrest in a Porcine Model.
Lin L(1), Wang P(1), Zheng H(2), Zhong Z(1), Zhuansun Y(1), Yang Z, Chen R.
ABSTRACT
INTRODUCTION: Although the effects on hemodynamics of gasping during cardiac arrest (CA) have received a lot of attention, less is known about the respiratory mechanics and physiology of respiration in gasping. To investigate the respiratory mechanics and neural respiratory drive of gasping during cardiac arrest in a porcine model. METHOD: Pigs weighing 34.9 ± 5.7 kg were anesthetized intravenously. Ventricular fibrillation (VF) was electrically induced and untreated for 10 min. Mechanical ventilation (MV) was ceased immediately after the onset of VF. Hemodynamic and respiratory parameters, pressure signals, diaphragmatic electromyogram (EMGdi) data, and blood gas analysis data were recorded. RESULTS: Gasping was observed in all the animals at a significantly lower rate (2-5 gaps/min), with higher tidal volume (VT) (0.62 ± 0.19 L, p < 0.01), and with lower expired minute volume (VE) (2.51 ± 1.49 L/min, p < 0.001) in comparison with the baseline. The total respiratory cycle time and the expiratory time tended to be lengthened. Statistically significant elevations in transdiaphragmatic pressure (Pdi), the pressure-time product of diaphragmatic

pressure (PTPdi), and the mean of root mean square EMGdi values (RMSmean) were observed ($p < 0.05$, $p < 0.05$, and $p < 0.001$, respectively); however, VT/RMSmean and Pdi /RMSmean were reduced at all time points. The partial pressure of oxygen (PO2) showed a continuous decline after VF to reach statistical significance in the 10th minute (9.46 ± 0.96 kPa, $p < 0.001$), while the partial pressure of carbon dioxide (PCO2) tended to first rise and then fall. CONCLUSIONS: Gasping during CA was characterized by high tidal volume, extremely low frequency and prolonged expiratory time, which may improve hypercapnia. During gasping, increased work of breathing and insufficient neuromechanical efficacy of neural respiratory drive (NRD) suggested the necessity of MV and appropriate management strategies for MV during resuscitation after CA.

CASE REPORTS

1. Int J Emerg Med. 2023 Apr 7;16(1):24. doi: 10.1186/s12245-023-00501-4.
Veno-venous extracorporeal membrane oxygenation support in the resuscitation from extreme metabolic acidosis (pH < 6.5) after drowning cardiac arrest: a case report.
Chai Y(#)(1), Zhang X(#)(2), Liu H(3).

ABSTRACT
BACKGROUND: Resuscitation in drowning victim with cardiac arrest is difficult because of severe metabolic acidosis and multiple organ dysfunction. There is insufficient evidence to support that veno-venous extracorporeal membrane oxygenation (VV-ECMO) is beneficial for patient. CASE PRESENTATION: A 44-year-old female was trapped under river when she attempted to rescue her drowning father. Furthermore, she underwent a loss of consciousness, with extreme metabolic acidosis, hypothermia and hypotension. Hence, the VV-ECMO, continuous renal replacement therapy (CRRT) and other resuscitative infusion were required. In this case, the patient did not experience any complication or neurologic deficit and reaching a complete recovery after 21 days of hospitalization. CONCLUSIONS: Our case adds further concerns in supporting a patient with extreme metabolic acidosis (pH < 6.5) and hypothermia after severe drowning cardiac arrest, including extracorporeal life support, renal support, targeted temperature management, cerebral resuscitation, etc., due to the reversible nature of this condition.

2. J Assoc Med Microbiol Infect Dis Can. 2023 Mar 1;8(1):99-104. doi: 10.3138/jammi-2022-0010. eCollection 2023 Mar.
Torsades de pointes associated with remdesivir treatment for COVID-19 pneumonia.
Fung JS(1), Levitan M(2), Landry S(3), McIsaac S(4)(5).

ABSTRACT
BACKGROUND: Prolonged QT interval (QTc) can be a serious adverse event from SARS-CoV-2 infection and associated treatment, including remdesivir. METHODS: We present a case of a 55-year-old woman with COVID-19 pneumonia who was treated with remdesivir. The QTc on admission was 483 ms. After three doses of remdesivir, she had an episode of non-sustained ventricular tachycardia. Repeat QTc was significantly prolonged at 609 ms. She experienced a polymorphic ventricular tachycardic cardiac arrest the next morning, thought to be secondary to torsades de pointes. RESULTS: Transthoracic echocardiogram showed normal biventricular function. Electrolytes were within normal limits. In the absence of other QTc-prolonging medications, remdesivir was thought to be inciting agent. Following discontinuation of remdesivir, the patient's QTc returned to baseline. CONCLUSIONS: There is a risk for cardiac events from QTc prolongation effects of SARS-CoV-2 infection and associated treatment. We recommend pharmacological profile review and cardiac monitoring for patients receiving remdesivir

3. Eur Heart J Case Rep. 2023 Mar 15;7(3):ytad125. doi: 10.1093/ehjcr/ytad125. eCollection 2023 Mar.

Inflammatory process of the COVID-19 fulminant myocarditis in the multimodality imaging: a case report.

Hara S(1), Miwa N(1), Hachiya H(1), Sasano T(2).

ABSTRACT
BACKGROUND: Cardiac manifest of COVID-19 infection was widely reported. The pathophysiology is thought the combination of direct damage caused by viruses and myocardial inflammation caused by immune responses. We tracked the inflammatory process of fulminant myocarditis associated with COVID-19 infection using multi-modality imaging. CASE SUMMARY: A 49-year-old male with COVID-19 went into cardiac arrest from severe left ventricular dysfunction and cardiac tamponade. He was treated with steroids, remdesivir, and tocilizumab but failed to maintain circulation. He recovered with pericardiocentesis and veno-arterial extracorporeal membrane oxygenation in addition to the immune suppression treatment. In this case, a series of chest computed tomography (CT) was performed on Days 4, 7, and 18 and cardiac magnetic resonance (MR) on Days 21, 53, and 145. DISCUSSION: Analysis of the inflammatory findings on CT in this case showed that intense inflammation around the pericardial space was observed at an early stage of the disease. Although inflammatory findings in the pericardial space and chemical markers had improved according to non-magnetic resonance imaging (MRI) tests, the MRI revealed a notable long inflammatory period more than 50 days.

4. Medicine (Baltimore). 2023 Apr 7;102(14):e33437. doi: 10.1097/MD.0000000000033437.

Paradoxical massive pulmonary thromboembolism in a postpartum woman with factor VII deficiency with bleeding tendency: A case report.

Kang D(1), Cha H(1), Park SE(2), Ahn JH(3), Park JK(4), Kwon I(5), Park JE(5)(6).

ABSTRACT
RATIONALE: Factor VII (FVII) deficiency is an inherited bleeding disorder, and women with FVII deficiency are at risk of gynecological bleeding and postpartum hemorrhage. There have been no reports of pulmonary embolism in a postpartum woman with FVII deficiency as of yet. We report a case of postpartum massive pulmonary embolism with FVII deficiency. PATIENT CONCERNS: A 32-year-old woman visited the hospital with premature rupture of membranes at 24 weeks and 4 days of gestation. She was diagnosed with FVII deficiency in an additional blood test after her laboratory results at admission included an increased prothrombin time and international normalized ratio abnormalities. After 12 days of pregnancy maintenance treatment, an emergency cesarean delivery was performed due to uncontrolled preterm labor. The day after the operation, she suffered a sudden loss of consciousness and cardiac arrest, and after she received 1 cycle of cardiopulmonary resuscitation, she was moved to the intensive care unit. DIAGNOSES: She was diagnosed with massive pulmonary thromboembolism with heart failure by chest enhanced computed tomography, C-echo, and angiography. INTERVENTIONS: She was successfully treated with the early application of extracorporeal membrane oxygenation, catheter-guided thrombectomy, and anticoagulants. OUTCOMES: There were no major sequelae over 2 months of follow-up. LESSONS: FVII deficiency does not protect against thrombosis. Due to the high thrombotic risk after childbirth, the risk of thrombosis should be recognized, and thromboprophylaxis should be considered if additional obstetric thrombotic risk factors are present.