

CPR AND COVID-19

1. Prehosp Disaster Med. 2021 Oct 8:1-20. doi: 10.1017/S1049023X21001138. Online ahead of print.
Characteristics of Emergency Medical Service Missions in Out-of-Hospital Cardiac Arrest and Death Cases in the Periods of Before and After the COVID-19 Pandemic.

Hasani-Sharamin P(1)(2), Saberian P(1)(3), Sadeghi M(4), Mireskandari SM(5), Baratloo A(1)(6).

ABSTRACT

BACKGROUND: Some studies in countries affected by the coronavirus disease of 2019 (COVID-19) pandemic have shown that the missions of Emergency Medical Service (EMS) have changed during the COVID-19 pandemic, and the rate of death and out-of-hospital cardiac arrest (OHCA) has been increased due to the direct and indirect effects of COVID-19. **OBJECTIVE:** The aim of this study was to determine the effect of the COVID-19 pandemic on the process of EMS missions, death, and OHCA. **METHODS:** This cross-sectional study was performed in Tehran, Iran. All conducted missions in the first six months of the three consecutive solar years of March 21 until September 22 of 2018-2020, which were registered in the registry bank of the Tehran EMS center, were assessed and compared. Based on the opinion of experts, the technician's on-scene diagnoses were categorized into 14 groups, and then death and OHCA cases were compared. **RESULTS:** In this study, the data of 1,050,376 missions performed in three study periods were analyzed. In general, the number of missions in 2020 was 17.83% fewer than that of 2019 ($P < .001$); however, the number of missions in 2019 was 30.33% more than that of 2018. On the other hand, the missions of respiratory problems, cardiopulmonary arrest, infectious diseases, and poisoning were increased in 2020 compared to that of 2019. The raw number of OHCA and death cases respectively in 2018, 2019, and 2020 were 25.0, 22.7, and 28.6 cases per 1,000 missions. Of all patients who died in 2020, 4.9% were probable/confirmed COVID-19 cases. The history of heart disease, hypertension, diabetes, and respiratory disease in patients in 2020 was more frequent than that of the other two years. **CONCLUSION:** This study showed that the number of missions in the Tehran EMS in 2020 were decreased compared to that of 2019, however the number of missions in 2019 was more than that of 2018. Respiratory problems, infectious diseases, poisoning, death, and OHCA were increased compared to the previous two years and cardiovascular complaints, neurological problems, and motor vehicle collisions (MVCs) in 2020 were fewer than that of the other two years.

2. Crit Care Med. 2021 Oct 1. doi: 10.1097/CCM.0000000000005374. Online ahead of print.

Coronavirus Disease 2019 and Out-of-Hospital Cardiac Arrest: No Survivors.

Baert V(1), Beuscart JB, Recher M, Javaudin F, Hugenschmitt D, Bony T, Revaux F, Mansouri N, Larcher F, Chazard E, Hubert H; French National OHCA Registry (RéAC) Study Group.

ABSTRACT

OBJECTIVES: To describe and compare survival among patients with out-of-hospital cardiac arrest as a function of their status for coronavirus disease 2019. **DESIGN:** We performed an observational study of out-of-hospital cardiac arrest patients between March 2020 and December 2020. Coronavirus disease 2019 status (confirmed, suspected, or negative) was defined according to the World Health Organization's criteria. **SETTING:** Information on the patients and their care was extracted from the French national out-of-hospital cardiac arrest registry. The French prehospital emergency medical system has two tiers: the fire department intervenes rapidly to provide basic life support, and mobile ICUs provide advanced life support. The study data (including each patient's coronavirus disease 2019 status) were collected by 95 mobile ICUs throughout France. **PATIENTS:** We included 6,624 out-of-hospital cardiac arrest patients: 127 cases with confirmed coronavirus

disease 2019, 473 with suspected coronavirus disease 2019, and 6,024 negative for coronavirus disease 2019. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: The "confirmed" and "suspected" groups of coronavirus disease 2019 patients had similar characteristics and were more likely to have suffered an out-of-hospital cardiac arrest with a respiratory cause (confirmed: 53.7%, suspected coronavirus disease 2019: 56.5%; $p = 0.472$) than noncoronavirus disease 2019 patients (14.0%; $p < 0.001$ vs confirmed coronavirus disease 2019 patients). Advanced life support was initiated for 57.5% of the confirmed coronavirus disease 2019 patients, compared with 64.5% of the suspected coronavirus disease 2019 patients ($p = 0.149$) and 70.6% of the noncoronavirus disease 2019 ones ($p = 0.002$). The survival rate at 30-day postout-of-hospital cardiac arrest was 0% in the confirmed coronavirus disease 2019 group, 0.9% in the suspected coronavirus disease 2019 group ($p = 0.583$ vs confirmed), and 3.5% ($p = 0.023$) in the noncoronavirus disease 2019 group. CONCLUSIONS: Our results highlighted a zero survival rate in out-of-hospital cardiac arrest patients with confirmed coronavirus disease 2019. This finding raises important questions with regard to the futility of resuscitation for coronavirus disease 2019 patients and the management of the associated risks.

CPR/MECHANICAL CHEST COMPRESSION

1. *Cardiol J.* 2021 Oct 8. doi: 10.5603/CJ.a2021.0115. Online ahead of print.

Meta-analysis of chest compression-only versus conventional cardiopulmonary resuscitation by bystanders for adult with out-of-hospital cardiac arrest.

Bielski K(1)(2), Smereka J(2)(3), Chmielewski J(4), Pruc M(2), Chirico F(5)(6), Gasecka A(7)(8), Litvinova N(9), Jaguszewski MJ(10), Nowak-Starz G(11), Rafique Z(12), Peacock FW(12), Szarpak L(13)(14)(15).

ABSTRACT

BACKGROUND: According to the guidelines of cardiopulmonary resuscitation (CPR) conducted by bystanders, two methods of CPR are feasible: standard CPR (sCPR) with mouth-to-mouth ventilations and continuous chest compression-only CPR (CCC) without rescue breathing. The goal herein, was to evaluate the effect of sCPR (30:2) and CCC on resuscitation outcomes in patients with out-of-hospital cardiac arrest (OHCA) patients. **METHODS:** This study was a systematic review and meta-analysis. Using standardized criteria, PubMed, Web of Science, Scopus, EMBASE and Cochrane Collaboration were searched for trials assessing the effect of sCPR vs. CCC on resuscitation outcomes after adult OHCA. Random-effects model meta-analysis was applied to calculate the mean deviation (MD), odds ratio (OR) and 95% confidence interval (CI). **RESULTS:** Overall, 3 randomized controlled trials and 12 non-randomized trials met the inclusion criteria. Survival to hospital discharge (SHD) with sCPR was 10.2% compared to 9.3% in the CCC group (OR = 1.04; 95% CI: 0.93-1.16; $p = 0.46$). SHD with good neurological outcome measured with the cerebral performance category (CPC 1 or 2) was 6.5% for sCPR vs. 5.8% for CCC (OR = 1.00; 95% CI: 0.84-1.20; $p = 0.98$). Prehospital return of spontaneous circulation (ROSC) in sCPR and CCC groups was 15.9% and 14.8%, respectively (OR = 1.13; 95% CI: 0.91-1.39; $p = 0.26$). Survival to hospital admission with ROSC occurred in 29.5% of the sCPR group compared to 28.4% in CCC group (OR = 1.20; 95% CI: 0.89-1.63; $p = 0.24$). **CONCLUSIONS:** This systematic review and meta-analysis concluded that there were no significant differences in the resuscitation outcomes between the use of standard cardiopulmonary resuscitation and chest compression only.

REGISTRIES, REVIEWS AND EDITORIALS

1. J Chin Med Assoc. 2021 Oct 4. doi: 10.1097/JCMA.0000000000000630. Online ahead of print.

The Impact of Bystander CPR on Patients with Out-of-Hospital Cardiac Arrests.

Liou FY(1), Lin KC, Chien CS, Hung WT, Lin YY, Yang YP, Lai WY, Lin TW, Kuo SH, Huang WC.

ABSTRACT

Out-of-hospital cardiac arrest (OHCA) is one of the leading causes of death around the world. Bystander cardiopulmonary resuscitation (CPR) is an independent factor to improve OHCA survival. However, the prevalence of bystander CPR remains low worldwide. Community interventions such as mandatory school CPR training or targeting CPR training to family members of high-risk cardiac patients are possible strategies to improve bystander CPR rate. Real time feedback, hands-on practice with a manikin, and metronome assistance may increase the quality of CPR. Dispatcher-assistance and compression only CPR for untrained bystanders have shown to increase bystander CPR rate and increase survival to hospital discharge. After return of spontaneous circulation, targeted temperature management should be performed to improve neurological function. This review focuses on the impact of bystander CPR on clinical outcomes and strategies to optimize the prevalence and quality of bystander CPR.

2. Resuscitation. 2021 Sep 30:S0300-9572(21)00379-8. doi: 10.1016/j.resuscitation.2021.09.025.

Online ahead of print.

The rCAST score is Useful for Estimating the Neurological Prognosis in Pediatric Patients with Post-Cardiac Arrest Syndrome before ICU admission: External Validation Study Using a Nationwide Prospective Registry.

Yasuda Y(1), Nishikimi M(2), Matsui K(3), Numaguchi A(4), Nishida K(3), Emoto R(3), Matsui S(3), Matsuda N(4).

ABSTRACT

INTRODUCTION: The objective of this cohort study was to investigate whether the revised post-Cardiac Arrest Syndrome for Therapeutic hypothermia score (rCAST), which we previously developed as a prognostic score for adult patients with post-cardiac arrest syndrome (PCAS), is also applicable to pediatric patients. **METHODS:** Pediatric PCAS patients were included from an out-of-hospital cardiac arrest (OHCA) registry of the Japanese Association for Acute Medicine (JAAM). We validated the predictive accuracy of the rCAST for the neurological outcomes at 30 and 90 days. We also evaluated the probability of a good neurological outcome in each of the three specified severity categories based on the rCAST (low severity: ≤ 5.5 ; moderate severity: 6.0-14.0; high severity: ≥ 14.5). **RESULTS:** Among the 737 pediatric patients with OHCA, the data of 179 pediatric PCAS patients in whom return of spontaneous circulation was achieved were analyzed. The areas under the curve (AUC) of the rCAST for predicting the neurological outcomes at 30 days and 90 days were 0.95 (95% CI: 0.90-0.99) and 0.96 (0.91-1.00), respectively. The proportions of patients with a good neurological outcome at 30 days were 100% (12/12) in the low severity group, 36.1% (13/36) in the moderate severity group, and 2.3% (3/131) in the high severity group. **CONCLUSIONS:** The AUC of the rCAST for pediatric PCAS patients was found to be greater than 0.9 in the external validation, which corresponds to excellent predictive accuracy. There was no patient with good neurological outcome among the patients with more than 17.0 points (extremely high severity group).

3. Syst Rev. 2021 Oct 8;10(1):266. doi: 10.1186/s13643-021-01820-4.

A characterization of cortisol level and adrenal reservation in human cardiopulmonary arrest: systematic review and meta-analysis.

Sahebnasagh A(1), Nejad PS(2), Salehi-Abargouei A(3)(4), Dehghani MH(5), Saghafi F(6).

ABSTRACT

BACKGROUND: Cardiopulmonary arrest (CPA) is an urgency, which is associated with high mortality. This systematic review evaluated the relationship between baseline cortisol level and the outcome of resuscitated CPA patients. **METHODS:** We searched the following databases: PubMed, Scopus, ISI Web of Science, and Google Scholar. Relevant observational and controlled trials were explored from inception by April 2020. The quality of the articles was assessed using the Newcastle-Ottawa Scale (NOS). **RESULTS:** Finally, five cohort studies (n = 201 participants in total) were eligible for including in the meta-analysis. The results of this meta-analysis showed that although the baseline serum cortisol levels were higher in survivors of cardiac arrest compared with non-survivors, the differences between groups do not reach a significance level (Hedges' g = 0.371, 95% CI, -0.727, 1.469, P value = 0.508). Between-study heterogeneity was statistically significant (Cochrane Q test: P value < 0.001, I² = 89.323). **CONCLUSIONS:** The result of the present meta-analysis was suggestive of a higher baseline serum cortisol levels in survivors of CPA. Future randomized controlled studies with a large sample size will determine the exact relationship between adrenal reservation and the eventual outcome of patients with CPA.

4. Ann Emerg Med. 2021 Oct 1:S0196-0644(21)00726-5. doi: 10.1016/j.annemergmed.2021.07.132. Online ahead of print.

External Aortic Compression in Noncompressible Truncal Hemorrhage and Traumatic Cardiac Arrest: A Scoping Review.

Soeyland T(1), Hollott JD(2), Garner A(3).

ABSTRACT

External aortic compression has been investigated as a treatment for non-compressible truncal haemorrhage in trauma patients. We sought to systematically gather and tabulate the available evidence around external aortic compression. We were specifically interested in its ability to achieve hemostasis and aid in resuscitation of traumatic arrest and severe shock and to consider physiological changes and adverse effects. A scoping review approach was chosen due to the highly variable existing literature. We were guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, using the specific extension for scoping reviews. Searches were done on PubMed and Scopus databases in October 2020. We found that a range of studies have investigated external aortic compression in a variety of settings, including case reports and small case series, porcine hemorrhage models and effects on healthy volunteers. External aortic compression for postpartum hemorrhage in a single center provided some evidence of effectiveness. Overall the level of evidence is limited, however, external aortic compression does appear able to achieve cessation of distal blood flow. Furthermore, it appears to improve many relevant physiological parameters in the setting of hypovolemic shock. Application for more than 60 minutes appears to cause increasingly problematic complications. In conclusion we find that the role of external aortic compression warrants further research. The intervention may have a role as a bridge to definitive treatment of noncompressible truncal haemorrhage.

IN-HOSPITAL CARDIAC ARREST

No articles identified.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Resusc Plus. 2021 Sep 22;8:100167. doi: 10.1016/j.resplu.2021.100167. eCollection 2021 Dec.

Temporal variation in out-of-hospital cardiac arrest occurrence in individuals with or without diabetes.

van Dongen LH(1), de Goede P(2)(3), Moeller S(4), Eroglu TE(1)(4), Folke F(4)(5), Gislason G(4)(6), Blom MT(1), Elders PJM(7)(8), Torp-Pedersen C(9)(10)(11), Tan HL(1)(12).

ABSTRACT

OBJECTIVE: Out-of-hospital cardiac arrest (OHCA) occurrence has been shown to exhibit a circadian rhythm, following the circadian rhythm of acute myocardial infarction (AMI) occurrence. Diabetes mellitus (DM) is associated with changes in circadian rhythm. We aimed to compare the temporal variation of OHCA occurrence over the day and week between OHCA patients with DM and those without. **METHODS:** In two population-based OHCA registries (Amsterdam Resuscitation Studies [ARREST] 2010-2016, n = 4163, and Danish Cardiac Arrest Registry [DANCAR], 2010-2014, n = 12,734), adults (≥ 18 y) with presumed cardiac cause of OHCA and available medical history were included. Single and double cosinor analysis was performed to model circadian variation of OHCA occurrence. Stratified analysis of circadian variation was performed in patients with AMI as immediate cause of OHCA. **RESULTS:** DM patients (22.8% in ARREST, 24.2% in DANCAR) were older and more frequently had cardiovascular risk factors or previous cardiovascular disease. Both cohorts showed 24 h-rhythmicity, with significant amplitudes in single and double cosinor functions (P-range < 0.001). In both registries, a morning peak (10:00-11:00) and an evening peak (20:00-21:00) was observed in both DM and non-DM patients. No septadian variation was observed in either DM or non-DM patients (P-range 0.13-84). **CONCLUSIONS:** In these two population-based OHCA registries, we observed a similar circadian rhythm of OHCA occurrence in DM and non-DM patients.

2. Resusc Plus. 2021 Sep 21;8:100166. doi: 10.1016/j.resplu.2021.100166. eCollection 2021 Dec.

Spatiotemporal variation in the risk of out-of-hospital cardiac arrests in Queensland, Australia.

Doan TN(1)(2)(3), Wilson D(1), Rashford S(1), Ball S(4)(5), Bosley E(1)(6).

ABSTRACT

BACKGROUND: Spatiotemporal analysis of out-of-hospital cardiac arrest (OHCA) risk is essential to design targeted public health strategies. Such information is lacking in the state of Queensland and Australia more broadly. **METHODS:** We developed a spatiotemporal Bayesian model accounting for spatial and temporal dimensions, space-time interactions, and demographic factors. The model was fit to data of all OHCA cases attended by paramedics in Queensland between January 2007 and December 2019. Parameter inference was performed using the integrated nested Laplace approximation method. We estimated and thematically mapped area-year risk of OHCA occurrence for all 78 local government areas (LGAs) in Queensland. **RESULTS:** We observed spatial variability in OHCA risk among the LGAs. Areas in the north half of the state and two areas in the south exhibited the highest risk; whereas OHCA risk was lowest in the west and south west parts of the state. Demographic factors did not have significant impact on the heterogeneity of risk between the LGAs. An overall trend of modestly decreasing risk of OHCA was found. **CONCLUSIONS:** This study identified areas of high OHCA risk in Queensland, providing valuable information to guide public health policy and optimise resource allocation. Further research is needed to investigate the specifics of the areas that may explain their risk profile.

END-TIDAL CO₂

No articles identified.

ORGAN DONATION

1. Transplant Proc. 2021 Oct 1:S0041-1345(21)00618-7. doi: 10.1016/j.transproceed.2021.05.013. Online ahead of print.

Clinical Utility and Evolution of Donor Serum Lactate During Normothermic Regional Perfusion in Uncontrolled Donation After Circulatory Death.

Rodríguez-Villar C(1), Paredes D(2), Roque R(2), Reinoso J(2), Sanchez-Etayo G(2).

ABSTRACT

BACKGROUND: Kidney transplantation from uncontrolled donor after circulatory death (uDCD) showed a higher incidence of delayed graft function and primary failure. The aim of this study was to study basal and kinetic evolution of lactate values in uDCD preserved on normothermic regional perfusion (NRP) as a predictive factor of kidney suitability exposed to prolonged ischemic conditions. **METHODS:** Descriptive and prospective study of a cohort of out-of-hospital cardiac arrest patients admitted to the emergency room as potential uDCD. Donors meeting the inclusion criteria were preserved on NRP for at least 2 hours before procurement. Serum lactate levels were determined at arrival as basal level and at 30 minutes intervals and compared with adequate renal perfusion in the operating room (OR). **RESULTS:** Forty-five donors met inclusion criteria. Of these, 38 went to the OR (84.5%). No differences were found in basal lactate between accepted and rejected kidneys (203.08 ± 59.21 vs 175.43 ± 75.32 mg/dL, respectively); neither lactate, hematologic, hepatic transaminases, creatinine, or blood gas analysis sequential values evolved while on NRP. Lactate receiver operating characteristic curve failed to predict viability at different time points and did not correlate with the macroscopic kidney poor perfusion in the OR. **CONCLUSIONS:** The baseline and kinetic evolution of plasma lactate values while on NRP, were not useful tools to predict the final OR kidney viability owing to previous severe ischemic insult.

FEEDBACK

No articles identified.

DRUGS

1. World J Crit Care Med. 2021 Sep 9;10(5):290-300. doi: 10.5492/wjccm.v10.i5.290. eCollection 2021 Sep 9.

Clinical benefits of corticosteroid administration during adult cardiopulmonary resuscitation: A systemic review and meta-analysis.

Wongtanasarasin W(1), Krintratun S(2).

ABSTRACT

BACKGROUND: The clinical benefits of steroid administration during cardiac arrest remain unclear. Several studies reported that patients who received steroids after achieving a return of spontaneous circulation (ROSC) had better outcomes, but few studies have investigated the benefits of steroid administration during resuscitation. We hypothesized that administration of steroid during cardiac arrest would be associated with better clinical outcomes in adults with cardiac arrest. **AIM:** To

investigate the effect of steroid administration during cardiac arrest and the outcomes of resuscitation. **METHODS:** We included studies of participants older than 18 years of age who experienced cardiac arrest and included at least one arm that received corticosteroids during cardiac arrest. A literature search of PubMed and Embase on 31 January 2021 retrieved placebo-controlled studies without limitation for type, location, and initial presenting rhythm of cardiac arrest. The study outcomes were reported by odds ratios (ORs) compared with placebo. The primary outcome was survival rate at hospital discharge. Secondary outcomes included a sustained ROSC, survival rate at hospital admission, and neurological outcome at hospital discharge. **RESULTS:** Six studies including 146262 participants were selected for analysis. The risk of bias ranged from low to high for randomized-controlled trials (RCTs) and low (for non-RCTs). Steroid administration was associated with increased survival at hospital discharge [OR: 3.51, 95% confidence interval (CI): 1.98-6.20, $P < 0.001$], and steroid administration during cardiac arrest was associated with both an increased rate of sustained ROSC (OR: 1.81, 95%CI: 1.91-4.02, $P < 0.001$) and a favorable neurological outcome at hospital discharge (OR: 3.02, 95%CI: 1.26-7.24, $P = 0.01$). **CONCLUSION:** Steroid administration during cardiac arrest was associated with better outcomes of resuscitation. Further study of the use of steroid in the selected circumstances are warranted.

TRAUMA

No articles identified.

VENTILATION

No articles identified.

CEREBRAL MONITORING

1. Resuscitation. 2021 Oct 4:S0300-9572(21)00381-6. doi: 10.1016/j.resuscitation.2021.09.027.

Online ahead of print.

Development and validation of early prediction for neurological outcome at 90 days after return of spontaneous circulation in out-of-hospital cardiac arrest.

Nishioka N(1), Kobayashi D(2), Kiguchi T(3), Irisawa T(4), Yamada T(5), Yoshiya K(6), Park C(7), Nishimura T(8), Ishibe T(9), Yagi Y(10), Kishimoto M(11), Kim SH(12), Hayashi Y(13), Sogabe T(14), Morooka T(15), Sakamoto H(16), Suzuki K(17), Nakamura F(18), Matsuyama T(19), Okada Y(1), Matsui S(20), Yoshimura S(1), Kimata S(1), Kawai S(1), Makino Y(1), Kitamura T(20), Iwami T(21); CRITICAL Study Group Investigators.

ABSTRACT

AIM: To develop and validate a model for the early prediction of long-term neurological outcome in patients with non-traumatic out-of-hospital cardiac arrest (OHCA). **METHODS:** We analysed multicentre OHCA registry data of adult patients with non-traumatic OHCA who experienced return of spontaneous circulation (ROSC) and had been admitted to the intensive care unit between 2013 and 2017. We allocated 1329 (2013-2015) and 1025 patients (2016-2017) to the derivation and validation sets, respectively. The primary outcome was the dichotomized cerebral performance category (CPC) at 90 days, defined as good (CPC 1-2) or poor (CPC 3-5). We developed 2 models: model 1 included variables without laboratory data, and model 2 included variables with laboratory data available immediately after ROSC. Logistic regression with least absolute shrinkage and selection operator regularization was employed for model development. Measures of

discrimination, accuracy, and calibration (C-statistics, Brier score, calibration plot, and net benefit) were assessed in the validation set. RESULTS: The C-statistic (95% confidence intervals) of models 1 and 2 in the validation set was 0.947 (0.930-0.964) and 0.950 (0.934-0.966), respectively. The Brier score of models 1 and 2 in the validation set was 0.063 and 0.062, respectively. The calibration plot showed that both models were well-calibrated to the observed outcome. Decision curve analysis indicated that model 2 was similar to model 1. CONCLUSION: The prediction tool containing detailed in-hospital information showed good performance for predicting neurological outcome at 90 days immediately after ROSC in patients with OHCA.

2. Front Med (Lausanne). 2021 Sep 16;8:697906. doi: 10.3389/fmed.2021.697906. eCollection 2021. Initial Blood pH, Lactate and Base Deficit Add No Value to Peri-Arrest Factors in Prognostication of Neurological Outcome After Out-of-Hospital Cardiac Arrest.

Mueller M(1), Grafeneder J(1)(2), Schoergenhofer C(2), Schwameis M(1), Schriefl C(1), Poppe M(1), Clodi C(1), Koch M(1), Sterz F(1), Holzer M(1), Ettl F(1).

ABSTRACT

Background: In cardiac arrest survivors, metabolic parameters [pH value, lactate concentration, and base deficit (BD)] are routinely added to peri-arrest factors (including age, sex, bystander cardio-pulmonary resuscitation, shockable first rhythm, resuscitation duration, adrenaline dose) to enhance early outcome prediction. However, the additional value of this strategy remains unclear. Methods: We used our resuscitation database to screen all patients ≥ 18 years who had suffered in- or out-of-hospital cardiac arrest (IHCA, OHCA) between January 1st, 2005 and May 1st, 2019. Patients with incomplete data, without return of spontaneous circulation or treatment with sodium bicarbonate were excluded. To analyse the added value of metabolic parameters to prognosticate neurological function, we built three models using logistic regression. These models included: (1) Peri-arrest factors only, (2) peri-arrest factors plus metabolic parameters and (3) metabolic parameters only. Receiver operating characteristics curves regarding 30-day good neurological function (Cerebral Performance Category 1-2) were analysed. Results: A total of 2,317 patients (OHCA: n = 1842) were included. In patients with OHCA, model 1 and 2 had comparable predictive value. Model 3 was inferior compared to model 1. In IHCA patients, model 2 performed best, whereas both metabolic (model 3) and peri-arrest factors (model 1) demonstrated similar power. PH, lactate and BD had interchangeable areas under the curve in both IHCA and OHCA. Conclusion: Although metabolic parameters may play a role in IHCA, no additional value in the prediction of good neurological outcome could be found in patients with OHCA. This highlights the importance of accurate anamnesis especially in patients with OHCA.

3. Crit Care Med. 2021 Oct 1;49(10):1790-1799. doi: 10.1097/CCM.0000000000005045.

Neuroprognostic Accuracy of Quantitative Versus Standard Pupillary Light Reflex for Adult Postcardiac Arrest Patients: A Systematic Review and Meta-Analysis.

Wang CH(1)(2), Wu CY(1), Liu CC(3), Hsu TC(1), Liu MA(4), Wu MC(1), Tsai MS(1)(2), Chang WT(1)(2), Huang CH(1)(2), Lee CC(1)(2), Chen SC(1)(2), Chen WJ(1)(2)(5).

ABSTRACT

OBJECTIVES: An automated infrared pupillometer measures quantitative pupillary light reflex using a calibrated light stimulus. We examined whether the timing of performing quantitative pupillary light reflex or standard pupillary light reflex may impact its neuroprognostic performance in postcardiac arrest comatose patients and whether quantitative pupillary light reflex may outperform standard pupillary light reflex in early postresuscitation phase. DATA SOURCES: PubMed and Embase databases from their inception to July 2020. STUDY SELECTION: We selected studies providing sufficient data of prognostic values of standard pupillary light reflex or quantitative pupillary light

reflex to predict neurologic outcomes in adult postcardiac arrest comatose patients. DATA EXTRACTION: Quantitative data required for building a 2 × 2 contingency table were extracted, and study quality was assessed using standard criteria. DATA SYNTHESIS: We used the bivariate random-effects model to estimate the pooled sensitivity and specificity of standard pupillary light reflex or quantitative pupillary light reflex in predicting poor neurologic outcome during early (< 72 hr), middle (between 72 and 144 hr), and late (\geq 145 hr) postresuscitation periods, respectively. We included 39 studies involving 17,179 patients. For quantitative pupillary light reflex, the cut off points used in included studies to define absent pupillary light reflex ranged from 0% to 13% (median: 7%) and from zero to 2 (median: 2) for pupillary light reflex amplitude and Neurologic Pupil index, respectively. Late standard pupillary light reflex had the highest area under the receiver operating characteristic curve (0.98, 95% CI [CI], 0.97-0.99). For early standard pupillary light reflex, the area under the receiver operating characteristic curve was 0.80 (95% CI, 0.76-0.83), with a specificity of 0.91 (95% CI, 0.85-0.95). For early quantitative pupillary light reflex, the area under the receiver operating characteristic curve was 0.83 (95% CI, 0.79-0.86), with a specificity of 0.99 (95% CI, 0.91-1.00). CONCLUSIONS: Timing of pupillary light reflex examination may impact neuro-prognostic accuracy. The highest prognostic performance was achieved with late standard pupillary light reflex. Early quantitative pupillary light reflex had a similar specificity to late standard pupillary light reflex and had better specificity than early standard pupillary light reflex. For postresuscitation comatose patients, early quantitative pupillary light reflex may substitute for early standard pupillary light reflex in the neurologic prognostication algorithm.

4. Semin Neurol. 2021 Oct;41(5):606-618. doi: 10.1055/s-0041-1733789. Epub 2021 Oct 7.

Neuroprognostication after Cardiac Arrest: Who Recovers? Who Progresses to Brain Death?

Carroll E(1), Lewis A(1)(2).

ABSTRACT

Approximately 15% of deaths in developed nations are due to sudden cardiac arrest, making it the most common cause of death worldwide. Though high-quality cardiopulmonary resuscitation has improved overall survival rates, the majority of survivors remain comatose after return of spontaneous circulation secondary to hypoxic ischemic injury. Since the advent of targeted temperature management, neurologic recovery has improved substantially, but the majority of patients are left with neurologic deficits ranging from minor cognitive impairment to persistent coma. Of those who survive cardiac arrest, but die during their hospitalization, some progress to brain death and others die after withdrawal of life-sustaining treatment due to anticipated poor neurologic prognosis. Here, we discuss considerations neurologists must make when asked, "Given their recent cardiac arrest, how much neurologic improvement do we expect for this patient?"

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Resuscitation. 2021 Oct 6:S0300-9572(21)00376-2. doi: 10.1016/j.resuscitation.2021.09.022.

Online ahead of print.

INCIDENCE, CHARACTERISTICS AND COMPLICATIONS OF DISPATCHER-ASSISTED CARDIOPULMONARY RESUSCITATION INITIATED IN PATIENTS NOT IN CARDIAC ARREST.

Yu Xin Ng J(1), Jiaying Sim Z(2), Javaid Siddiqui F(3), Shahidah N(4), Sieu-Hon Leong B(5), Tiah L(6), Yng Ng Y(7), Blewer A(8), Arulanandam S(9), Lynn Lim S(10), Eng Hock Ong M(11), Fu Wah Ho A(12).

ABSTRACT

AIM: Dispatcher-assisted cardiopulmonary resuscitation (DA-CPR) can increase bystander CPR rates and improve outcomes in out-of-hospital cardiac arrest (OHCA). Despite the use of protocols, dispatchers may falsely recognise some cases to be in cardiac arrest. Hence, this study aimed to find the incidence of DA-CPR initiated for non-OHCA cases, its characteristics and clinical outcomes in the Singapore population. **METHODS:** This was a multi-centre, observational study of all dispatcher-recognised cardiac arrests cases between January to December 2017 involving three tertiary hospitals in Singapore. Data was obtained from the Pan-Asian Resuscitation Outcomes Study cohort. Audio review of dispatch calls from the national emergency ambulance service were conducted and information about patients' clinical outcomes were prospectively collected from health records. Univariate analysis was performed to determine factors associated with in-hospital mortality among non-OHCA patients who received DA-CPR. **RESULTS:** Of the 821 patients recognised as having OHCA 328 (40.0%) were not in cardiac arrest and 173 (52.7%) of these received DA-CPR. No complications from chest compressions were found from hospital records. The top diagnoses of non-OHCA patients were cerebrovascular accidents (CVA), syncope and infection. Only final diagnoses of CVA (aOR 20.68), infection (aOR 17.34) and myocardial infarction (aOR 32.19) were significantly associated with in-hospital mortality. **CONCLUSION:** In this study, chest compressions initiated on patients not in cardiac arrest by dispatchers did not result in any reported complications and was not associated with in-hospital mortality. This provides reassurance for the continued implementation of DA-CPR.

2. JMIR Mhealth Uhealth. 2021 Oct 7;9(10):e31748. doi: 10.2196/31748.

Impact of a Mobile App on Paramedics' Perceived and Physiologic Stress Response During Simulated Prehospital Pediatric Cardiopulmonary Resuscitation: Study Nested Within a Multicenter Randomized Controlled Trial.

Lacour M(1), Bloudeau L(2), Combescure C(1)(3), Haddad K(4), Hugon F(4), Suppan L(1)(5), Rodieux F(1)(6), Lovis C(1)(7), Gervais A(1)(4), Ehrler F(1)(7), Manzano S(1)(4), Siebert JN(1)(4); PedAMINES Prehospital Group(8).

ABSTRACT

BACKGROUND: Out-of-hospital cardiac arrests (OHCAs) are stressful, high-stake events that are associated with low survival rates. Acute stress experienced in this situation is associated with lower cardiopulmonary resuscitation performance in calculating drug dosages by emergency medical services. Children are particularly vulnerable to such errors. To date, no app has been validated to specifically support emergency drug preparation by paramedics through reducing the stress level of this procedure and medication errors. **OBJECTIVE:** This study aims to determine the effectiveness of an evidence-based mobile app compared with that of the conventional preparation methods in reducing acute stress in paramedics at the psychological and physiological levels while safely preparing emergency drugs during simulated pediatric OHCA scenarios. **METHODS:** In a parent, multicenter, randomized controlled trial of 14 emergency medical services, perceived and physiologic stress of advanced paramedics with drug preparation autonomy was assessed during a 20-minute, standardized, fully video-recorded, and highly realistic pediatric OHCA scenario in an 18-month-old child. The primary outcome was participants' self-reported psychological stress perceived during sequential preparations of 4 intravenous emergency drugs (epinephrine, midazolam, 10% dextrose, and sodium bicarbonate) with the support of the PedAMINES (Pediatric Accurate Medication in Emergency Situations) app designed to help pediatric drug preparation (intervention) or conventional methods (control). The State-Trait Anxiety Inventory and Visual Analog Scale

questionnaires were used to measure perceived stress. The secondary outcome was physiologic stress, measured by a single continuous measurement of the participants' heart rate with optical photoplethysmography. RESULTS: From September 3, 2019, to January 21, 2020, 150 advanced paramedics underwent randomization. A total of 74 participants were assigned to the mobile app (intervention group), and 76 did not use the app (control group). A total of 600 drug doses were prepared. Higher State-Trait Anxiety Inventory-perceived stress increase from baseline was observed during the scenario using the conventional methods (mean 35.4, SD 8.2 to mean 49.8, SD 13.2; a 41.3%, 35.0 increase) than when using the app (mean 36.1, SD 8.1 to mean 39.0, SD 8.4; a 12.3%, 29.0 increase). This revealed a 30.1% (95% CI 20.5%-39.8%; $P < .001$) lower relative change in stress response in participants who used the app. On the Visual Analog Scale questionnaire, participants in the control group reported a higher increase in stress at the peak of the scenario (mean 7.1, SD 1.8 vs mean 6.4, SD 1.9; difference: -0.8, 95% CI -1.3 to -0.2; $P = .005$). Increase in heart rate during the scenario and over the 4 drugs was not different between the 2 groups. CONCLUSIONS: Compared with the conventional method, dedicated mobile apps can reduce acute perceived stress during the preparation of emergency drugs in the prehospital setting during critical situations. These findings can help advance the development and evaluation of mobile apps for OHCA management and should be encouraged.

3. Resuscitation. 2021 Sep 30:S0300-9572(21)00380-4. doi: 10.1016/j.resuscitation.2021.09.026. Online ahead of print.

More patients could benefit from dispatch of citizen first responders to cardiac arrests.

Metelmann C(1), Metelmann B(2), Herzberg L(2), Auricchio A(3), Baldi E(4), Benvenuti C(5), Burkart R(6), Fredman D(7), Krammel M(8), Müller MP(9), Scquizzato T(10), Stieglis R(11), Svensson L(7), Christian Thies K(12); European research collaboration on citizen first responders.

NO ABSTRACT AVAILABLE

4. Br J Sports Med. 2021 Oct 5:bjsports-2021-104663. doi: 10.1136/bjsports-2021-104663. Online ahead of print.

Cardiopulmonary resuscitation for sudden cardiac arrest on the field of play: improving our standard!

Mendes JJ(1)(2), Beckert P(3)(4).

NO ABSTRACT AVAILABLE

5. Med Teach. 2021 Oct 5:1. doi: 10.1080/0142159X.2021.1984410. Online ahead of print.

Urgent review of UK medical student CPR training recommended.

Nel JH(1), Hirosue S(1), Paton R(2).

NO ABSTRACT AVAILABLE

6. PLoS One. 2021 Oct 7;16(10):e0257162. doi: 10.1371/journal.pone.0257162. eCollection 2021.

Comprehensive assessment of a nationwide simulation-based course for artificial life support.

Puslecki M(1)(2)(3), Dabrowski M(3)(4), Ligowski M(2), Zakhary B(5), Said AS(6), Ramanathan K(7)(8)(9), Cooley E(10), Puslecki L(11), Stefaniak S(2), Ziemak P(12), Kiel-Puslecka I(12), Dabrowska A(1)(3), Klosiewicz T(1), Sip M(1), Zalewski R(1), Ladzinska M(2), Mrowczynski W(13), Ladzinski P(13), Szlanga L(3), Baumgart K(2), Kupidowski P(3), Szarpak L(3)(14)(15), Jemielity M(2), Perek B(2).

ABSTRACT

BACKGROUND: Successful implementation of medical technologies applied in life-threatening conditions, including extracorporeal membrane oxygenation (ECMO) requires appropriate preparation and training of medical personnel. The pandemic has accelerated the creation of new

ECMO centers and has highlighted continuous training in adapting to new pandemic standards. To reach high standards of patients' care, we created the first of its kind, National Education Centre for Artificial Life Support (NEC-ALS) in 40 million inhabitants' country in the Central and Eastern Europe (CEE). The role of the Center is to test and promote the novel or commonly used procedures as well as to develop staff skills on management of patients needing ECMO. METHOD: In 2020, nine approved and endorsed by ELSO courses of "Artificial Life Support with ECMO" were organized. Physicians participated in the three-day high-fidelity simulation-based training that was adapted to abide by the social distancing norms of the COVID-19 pandemic. Knowledge as well as crucial cognitive, behavioral and technical aspects (on a 5-point Likert scale) of management on ECMO were assessed before and after course completion. Moreover, the results of training in mechanical chest compression were also evaluated. RESULTS: There were 115 participants (60% men) predominantly in the age of 30-40 years. Majority of them (63%) were anesthesiologists or intensivists with more than 5-year clinical experience, but 54% had no previous ECMO experience. There was significant improvement after the course in all cognitive, behavioral, and technical self-assessments. Among aspects of management with ECMO that all increased significantly following the course, the most pronounced was related to the technical one (from approximately 1.0 to more 4.0 points). Knowledge scores significantly increased post-course from $11.4 \pm SD$ to $13 \pm SD$ (out of 15 points). The quality of manual chest compression relatively poor before course improved significantly after training. CONCLUSIONS: Our course confirmed that simulation as an educational approach is invaluable not only in training and testing of novel or commonly used procedures, skills upgrading, but also in practicing very rare cases. The implementation of the education program during COVID-19 pandemic may be helpful in founding specialized Advanced Life Support centers and teams including mobile ones. The dedicated R&D Innovation Ecosystem established in the "ECMO for Greater Poland" program, with developed National Education Center can play a crucial role in the knowledge and know-how transfer but future research is needed.

POST-CARDIAC ARREST TREATMENTS

1. Resuscitation. 2021 Oct 5:S0300-9572(21)00387-7. doi: 10.1016/j.resuscitation.2021.09.032. Online ahead of print.

Pulse oximetry waveform: a non-invasive physiological predictor for the return of spontaneous circulation in cardiac arrest patients ---- A multicenter, prospective observational study.

Xu J(1), Li C(2), Tang H(1), Tan D(3), Fu Y(1), Zong L(1), Jing D(4), Ding B(5), Cao Y(6), Lu Z(7), Tian Y(8), Chai Y(9), Meng Y(10), Wang Z(11), Zheng YA(12), Zhao X(13), Zhang X(14), Liang L(15), Zeng Z(16), Li Y(1), Walline JH(17), Song PP(17), Zheng L(18), Sun F(19), Shao S(20), Sun M(21), Huang M(4), Zeng R(5), Zhang S(6), Yang X(7), Yao D(8), Yu M(9), Liao H(10), Xiong Y(11), Zheng K(12), Qin Y(13), An Y(14), Liu Y(15), Chen K(4), Zhu H(1), Yu X(1), Du B(22).

ABSTRACT

OBJECTIVE: This study aimed to investigate the predictive value of pulse oximetry plethysmography (POP) for the return of spontaneous circulation (ROSC) in cardiac arrest (CA) patients. METHODS: This was a multicenter, observational, prospective cohort study of patients hospitalized with cardiac arrest at 14 teaching hospitals cross China from December 2013 through November 2014. The study endpoint was ROSC, defined as the restoration of a palpable pulse and an autonomous cardiac rhythm lasting for at least 20 minutes after the completion or cessation of CPR. RESULTS: 150 out-of-hospital cardiac arrest (OHCA) patients and 291 in-hospital cardiac arrest (IHCA) patients were enrolled prospectively. ROSC was achieved in 20 (13.3%) and 64 (22.0%) patients in these cohorts, respectively. In patients with complete end-tidal carbon dioxide (ETCO₂) and POP data, patients with ROSC had significantly higher levels of POP area under the curve (AUC_p), wave amplitude (Amp) and ETCO₂ level during CPR than those without ROSC (all $p < 0.05$). Pairwise comparison of receiver

operating characteristic (ROC) curve analysis indicated no significant difference was observed between ETCO₂ and Amp ($p=0.204$) or AUCp ($p=0.588$) during the first two minutes of resuscitation. CONCLUSION: POP may be a novel and effective method for predicting ROSC during resuscitation, with a prognostic value similar to ETCO₂ at early stage.

TARGETED TEMPERATURE MANAGEMENT

1. Medicine (Baltimore). 2021 Oct 8;100(40):e27463. doi: 10.1097/MD.00000000000027463.

Prognostic role of serum neutrophil gelatinase-associated lipocalin in cardiac arrest patients: A prospective observational study.

Kang C(1), In YN(2)(3), Park JS(1)(2), You Y(1), Min JH(2)(3), Jeong W(1), Ahn HJ(1)(2), Cho YC(1), Ryu S(1).

ABSTRACT

Accurate neurological prognostication is of the utmost importance to avoid futile treatments in patients treated with targeted temperature management (TTM) after out-of-hospital cardiac arrest (OHCA). This study aimed to investigate the prognostic value of serum neutrophil gelatinase-associated lipocalin (NGAL) by comparing with neuron-specific enolase (NSE), which is currently recommended by international guidelines in patients treated with TTM after OHCA. The study included 85 comatose adult patients with OHCA who underwent TTM between May 2018 and December 2020. Serum NGAL and NSE were measured at 24-hour intervals until 72 hours after return of spontaneous circulation (ROSC). The primary outcome was their prognostic performance for poor neurological outcome at 3 months after OHCA. Forty-nine patients (57.6%) had a poor neurological outcome; NGAL levels at all time points measured were significantly higher in these patients than in those with a good outcome ($P < .01$). NGAL showed lower maximal sensitivity (95% confidence interval [CI]) under a false-positive rate of 0% for the primary outcome compared with NSE (18.2% [95% CI 8.2-32.7] vs 66.7% [95% CI 50.5-80.4]). The combination of NGAL with NSE at 48 h showed the highest sensitivity (69.1% [95% CI 52.9-82.4]) and had the highest area under the curve (0.91 [95% CI 0.81-0.96]) for a poor outcome. The prognostic performance of NGAL alone was inadequate at all time points. However, NGAL combined with NSE at 24 and 28 hours after ROSC showed improved sensitivity compared to NGAL alone. NGAL should be considered a supplementary biomarker in combination with NSE for prognostication in patients with OHCA treated with TTM.

2. CJEM. 2021 Oct 5. doi: 10.1007/s43678-021-00211-x. Online ahead of print.

Does hypothermia versus normothermia after out-of-hospital cardiac arrest improve patient-oriented outcomes?

Greer A(1), Rochweg B(2)(3), Sharif S(4)(2).

NO ABSTRACT AVAILABLE

ELECTROPHYSIOLOGY AND DEFIBRILLATION

No articles identified.

PEDIATRICS AND CHILDREN

1. J Am Heart Assoc. 2021 Oct 6:e018050. doi: 10.1161/JAHA.120.018050. Online ahead of print.

Two-Thumb Technique Is Superior to Two-Finger Technique in Cardiopulmonary Resuscitation of Simulated Out-of-Hospital Cardiac Arrest in Infants.

Cioccari G(1), Sica da Rocha T(2)(3), Piva JP(2)(3).

ABSTRACT

Background To compare the 2-finger and 2-thumb chest compression techniques on infant manikins in an out-of-hospital setting regarding efficiency of compressions, ventilation, and rescuer pain and fatigue. **Methods and Results** In a randomized crossover design, 78 medical students performed 2 minutes of cardiopulmonary resuscitation with mouth-to-nose ventilation at a 30:2 rate on a Resusci Baby Q CPR infant manikin (Laerdal, Stavanger, Norway), using a barrier device and the 2-finger and 2-thumb compression techniques. Frequency and depth of chest compressions, proper hand position, complete chest recoil at each compression, hands-off time, tidal volume, and number of ventilations were evaluated through manikin-embedded SkillReporting software. After the interventions, standard Likert questionnaires and analog scales for pain and fatigue were applied. The variables were compared by a paired t-test or Wilcoxon test as suitable. Seventy-eight students participated in the study and performed 156 complete interventions. The 2-thumb technique resulted in a greater depth of chest compressions (42 versus 39.7 mm; $P < 0.01$), and a higher percentage of chest compressions with adequate depth (89.5% versus 77%; $P < 0.01$). There were no differences in ventilatory parameters or hands-off time between techniques. Pain and fatigue scores were higher for the 2-finger technique (5.2 versus 1.8 and 3.8 versus 2.6, respectively; $P < 0.01$). **Conclusions** In a simulation of out-of-hospital, single-rescuer infant cardiopulmonary resuscitation, the 2-thumb technique achieves better quality of chest compressions without interfering with ventilation and causes less rescuer pain and fatigue.

EXTRACORPOREAL LIFE SUPPORT

No articles identified.

EXPERIMENTAL RESEARCH

1. Shock. 2021 Oct 5. doi: 10.1097/SHK.0000000000001869. Online ahead of print.

UAMC-3203 OR/and Deferoxamine Improve Post-Resuscitation Myocardial Dysfunction Through Suppressing Ferroptosis In A Rat Model of Cardiac Arrest.

Jin T(1), He Q, Cheng C, Li H, Lian L, Zhang G, Su C, Yan X, Bradley J, Peberdy MA, Ornato JP, Tang W.

ABSTRACT

Blocking ferroptosis reduces ischemia-reperfusion injury in some pathological contexts. However, there is no evidence that ferroptosis contributes to post-resuscitation myocardial dysfunction (PRMD). Here, we evaluated the therapeutic performance of ferroptosis inhibitors (UAMC 3203 or/and Deferoxamine) on the PRMD in a rat model of cardiac arrest and surveyed the changes of essential ferroptosis markers in the myocardium. Remarkably, all treatments reduce the severity of cardiac dysfunction and microcirculation hypoperfusion after resuscitation compared with control. Consistently, we observe that the ferroptosis marker Glutathione peroxidase 4, 4-hydroxynonenal and non-heme iron altered (1 ± 0.060 vs. 0.021 ± 0.016 , 1 ± 0.145 vs. 3.338 ± 0.221 , 52.010 ± 3.587 ug/g vs. 70.500 ± 3.158 ug/g, all $P < 0.05$) in the myocardium after resuscitation. These changes were significantly suppressed by UAMC-3203 [$(0.187 \pm 0.043, 2.848 \pm 0.169, \text{all } P < 0.05)$, (72.43 ± 4.920 ug/g, $P > 0.05$)], or Deferoxamine ($0.203 \pm 0.025, 2.683 \pm 0.273, 55.95 \pm 2.497$ ug/g, all $P < 0.05$). Briefly, UAMC-3203 or/and Deferoxamine improve post-resuscitation myocardial dysfunction and provide evidence of ferroptosis involvement, suggesting that ferroptosis inhibitors

could potentially provide an innovative therapeutic approach for mitigating the myocardial damage caused by cardiopulmonary resuscitation.

CASE REPORTS

1. Wilderness Environ Med. 2021 Oct 4:S1080-6032(21)00161-7. doi: 10.1016/j.wem.2021.08.007. Online ahead of print.

Resuscitation of an Unconscious Victim of Accidental Hyperthermia in 1805.

Wallner B(1), Giesbrecht G(2), Pasquier M(3), Gordon L(4), Lechner R(5), Brugger H(6), Paal P(7), Darocha T(8), Zafren K(9).

ABSTRACT

In 1805, W.D., a 16-y-old boy, became hypothermic after he was left alone on a grounded boat in Leith Harbour, near Edinburgh, Scotland. He was brought to his own house and resuscitated with warm blankets, smelling salts, and massage by Dr. George Kellie. W.D. made an uneventful recovery. We discuss the pathophysiology and treatment of accidental hypothermia, contrasting treatment in 1805 with treatment today. W.D. was hypothermic when found by passersby. Although he appeared dead, he was rewarmed with help from Dr. Kellie and his assistants over 200 y ago using simple methods. One concept that has not changed is the critical importance of attempting resuscitation, even if it seems to be futile. Don't give up!

2. Int Med Case Rep J. 2021 Sep 24;14:675-681. doi: 10.2147/IMCRJ.S317404. eCollection 2021.

Prioritized Brain Circulation During Ergometer Cycling with Apnea and Face Immersion in Ice-Cold Water: A Case Report.

Bjertnaes LJ(1)(2), Hauge A(3), Thoresen M(3)(4), Walløe L(3).

ABSTRACT

BACKGROUND: Successful cardiopulmonary resuscitation after drowning or avalanche is often attributed to hypothermia-induced decrease in metabolism, which adapts the oxygen demand to the amount supplied under cardiac compression. Four decades ago, we speculated if oxygen-sparing mechanisms like those found in marine mammals, may improve cerebral oxygenation during acute airway blockade in humans. We investigated hemodynamic changes during steady state ergometer cycling with intermittent periods of apnea and face immersion (AFI) in ice-cold water. During AFI, heart rate (HR) dropped by 58% whereas average blood velocity (ABV) determined by means of a Doppler ultrasound velocity meter (UNIDOP University of Oslo, Oslo, Norway) fell by 85% in the radial artery and rose by 67% in the vertebral artery. Similar changes occurred in radial artery ABV, albeit more slowly, when the test subject only held his breath while cycling. When he breathed via a snorkel during face immersion, HR remained unchanged while radial artery ABV fell transiently and subsequently returned to its pre-immersion level. These findings later were confirmed by other investigators. Moreover, a recent study revealed that the seal even has a system for selective brain cooling during the dive.**CONCLUSION:** Our research has confirmed prioritized cerebral circulation during AFI in cold water. We hypothesize that these changes may improve brain oxygenation due both to greater blood flow and possibly also to faster brain cooling, as demonstrated in diving seals.

3. Case Rep Crit Care. 2021 Sep 25;2021:9932485. doi: 10.1155/2021/9932485. eCollection 2021.

Where Did the Pericardial Effusion Go? A Case of Cardiopulmonary Resuscitation Acting as Treatment for Pericardial Tamponade.

Gonuguntla VT(1), Soni P(1), Dalsania N(1), Patti RK(1), Navjot S(1), Chanaka S(1), Kupfer Y(1).

ABSTRACT

Pericardial tamponade results in multiple organ dysfunction and can lead to cardiac arrest. Cardiopulmonary resuscitation (CPR), a life-saving measure performed on patients in cardiac arrest, can lead to thoracic organ damage. However, CPR rarely acts as a therapeutic treatment for pericardial tamponade. Our case describes a patient admitted with pericardial tamponade in whom CPR provided therapeutic treatment with pericardial rupture and resolution of the tamponade.

4. *Pediatr Emerg Care*. 2021 Oct 1;37(10):e653-e659. doi: 10.1097/PEC.0000000000001735.

Treatment of Hypothermic Cardiac Arrest in the Pediatric Drowning Victim, a Case Report, and Systematic Review.

Bauman BD(1), Louiselle A(2), Nygaard RM(3), Vakayil V(1), Acton R, Hess D, Saltzman D, Kreykes N(4), Fischer G(5), Louie J(5), Segura B.

ABSTRACT

OBJECTIVES: Drowning is the second leading cause of death in children. Extracorporeal membrane oxygenation (ECMO) has become the criterion standard therapy to resuscitate the hypothermic drowning victim in cardiac arrest. We present our own experience treating 5 children with hypothermic cardiac arrest in conjunction with a systematic review to analyze clinical features predictive of survival. **METHODS:** Our search resulted in 55 articles. Inclusion criteria were as follows: (1) younger than 18 years, (2) ECMO therapy, and (3) drowning. Ten articles met our inclusion criteria. We included studies using both central and peripheral ECMO and salt or fresh water submersions. We compared clinical features of survivors to nonsurvivors. **RESULTS:** A total of 29 patients from the 10 different studies met our criteria. Data analyzed included presenting cardiac rhythm, time to initiation of ECMO, submersion time, pH, potassium, lactate, duration of chest compressions, and survival. There was a significant increase in mortality for presenting rhythm of asystole and with hyperkalemia ($P < 0.05$). **CONCLUSIONS:** Extracorporeal membrane oxygenation is an important resuscitation tool for the hypothermic drowning victim. Hyperkalemia and presenting cardiac rhythm correlate with survival although they are not reasons to end resuscitation. More studies are needed to compare the outcomes in using ECMO for the hypothermic drowning victim.