This week's PubMed 21st – 27th November 2021: articles of interest n = 48

CPR AND COVID-19

1. Prehosp Disaster Med. 2021 Dec;36(6):676-683. doi: 10.1017/S1049023X21001138. Epub 2021 Oct 8.

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.

CPR/MECHANICAL CHEST COMPRESSION

1. Resusc Plus. 2021 Nov 12;8:100177. doi: 10.1016/j.resplu.2021.100177. eCollection 2021 Dec.

Different Resting Methods in Improving Laypersons Hands-Only Cardiopulmonary Resuscitation Quality and Reducing Fatigue: A Randomized Crossover Study.

Dong X(1)(2), Zhou Q(3), Lu Q(4), Sheng H(5), Zhang L(6), Zheng ZJ(1)(2).

ABSTRACT

OBJECTIVE: To determine the effects of different resting methods with various rest-start points or rest-compression ratios on improving cardiopulmonary resuscitation (CPR) quality and reducing fatigue during continuous chest compressions (CCC) in 10-min hands-only CPR scenario. METHODS: This prospective crossover study was conducted in 30 laypersons aged 18-65. Trained participants were randomized to follow different orders to perform following hands-only CPR methods: (1) CCC, 10-min CCC; (2) 4+6, 4-min CCC + 6-min of 10-s pause after 60-s compressions; (3) 2+8 (10/60), 2-

min CCC + 8-min of 10-s pause after 60-s compressions; (4) 5/30, 2-min CCC + 8-min of 5-s pause after 30-s compressions; (5) 3/15, 2-min CCC + 8-min of 3-s pause after 15-s compressions. CPR quality (depth, rate, hands-off duration, chest compression fraction (CCF)) and participants' fatigue indicators (heart rate, blood pressure, rating of perceived exertion (RPE)) were compared among methods of different rest-start points and different rest-compression ratios with CCC. RESULTS: Twenty-eight participants completed all methods. All resting methods reduced the trend of declining compression depth and the trend of increasing RPE while maintaining CCF of more than 86%. In methods with different rest-start points, the 2+8 method showed no difference in overall CPR quality or fatigue, but better CPR quality of every minute than 4+6 method. In methods with different rest-compression ratios, the 3/15 method showed the best CPR quality and the highest heart rate increment. CONCLUSION: During prolonged hands-only CPR, appropriate transient rests were associated with higher CPR quality and lower subjectively perceived fatigue in laypersons.

REGISTRIES, REVIEWS AND EDITORIALS

1. Resusc Plus. 2021 Nov 14;8:100182. doi: 10.1016/j.resplu.2021.100182. eCollection 2021 Dec.
Case completeness in the Norwegian Cardiac Arrest Registry.
Alm-Kruse K(1)(2), Tjelmeland I(2)(3)(4), Kongsgård H(3), Kvåle R(5)(6), Kramer-Johansen J(2)(3).
ABSTRACT
INTRODUCTION: This study aimed to assess the case completeness of out-of-hospital cardiac arrests (OHCA) in the Norwegian Cardiac Arrest Registry (NorCAR) and describe the differences between the registered and missing patients identified from the case-control assessment. METHODS: We identified the relevant patients in the Norwegian Patient Registry and the Norwegian Cause of Death Registry and compared them with the patients in NorCAR. Data processors used patient records to confirm if the potential cardiac arrest cases met the inclusion criteria in NorCAR. RESULTS: Between 2015 and 2017, 8612 OHCA patients were registered in NorCAR. Through the Patient Registry and the Cause of Death Registry we identified 11,114 potential OHCA patients, 3469 of these were already registered in NorCAR. After evaluating the patient records for the remaining 7645 patients, we found 344 patients (4%), were eligible for inclusion in NorCAR, giving a case completeness of 96%. The registered and missing patients were similar in age and gender distribution. Initial shockable rhythm and presumed cause were also comparable. However, the missing patients more frequently achieved return of spontaneous circulation, were more often transported to hospital, and had higher survival rates. The already registered patients had more key variables registered than the missing patients. CONCLUSION: Our results indicate high case completeness in NorCAR. The missing patients were too few to introduce significant changes in the distribution of patient characteristics, indicating that NorCAR is representative of the Norwegian OHCA population.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2021 Nov 18:S0300-9572(21)00461-5. doi: 10.1016/j.resuscitation.2021.11.009. Online ahead of print.
Predictors and Outcomes of Cardiac Arrest in the Emergency Department and In-patient Settings in the United States (2016 - 2018).
Mir T(1), Qureshi WT(2), Uddin M(3), Soubani A(1), Saydain G(3), Rab T(3), Kakouros N(4).
ABSTRACT
BACKGROUND: Outcomes of cardiac arrest (CA) remain dismal despite therapeutic advances. Literature is limited regarding outcomes of CA in emergency departments (ED). OBJECTIVE: To study

the possible causes, predictors, and outcomes of CA in ED and in-patient settings throughout the United States (US). METHODS: Data from the US national emergency department sample (NEDS) was analyzed for the episodes of CA for 2016-2018. In-hospital CA was divided into in-patient (IPCA) and in the ED (EDCA). Only patients who had cardiopulmonary resuscitation (CPR) within the hospital were included in the study (out-of-hospital were excluded). RESULTS: A total of 1,068,847 CA (mean age 63.7±19.4 years, 24%females), of whom 325,062(30.4%) EDCA and 177,104(16.6%) IPCA were included in the study. Patients without CPR, 743,785(69.6%), were excluded. Survival was higher among IPCA 55,821(31.6%) than the EDCA 32,516(10%). IPCA encounters had multifactorial associated etiologies including respiratory failure(73%), acidosis(38.7%) sepsis(36.8%) and ST-elevated myocardial infarction (STEMI)(7.3%). Majority of ED arrests (67.1%) had no possible identifiable cause. The predominant known causes include intoxication(7.5%), trauma (6.4%), respiratory failure(5%), and STEMI(2.7%). Cardiovascular interventions had significant survival benefits in IPCA on univariate logistic regression after coarsened exact matching for comorbidities. IPCA had higher intervention rates than EDCA. For all live discharges, a total of 40% of patients were discharged to hospice. CONCLUSION: Survival remains dismal among CA patients especially those occurring in the ED. Given that there are considerable variations in the etiology between the two studied cohorts, more research is required to improve the understanding of these factors, which may improve survival outcomes.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Br J Clin Pharmacol. 2021 Nov 26. doi: 10.1111/bcp.15157. Online ahead of print.
Opioid use is associated with increased out-of-hospital cardiac arrest risk among 40,000-cases across two countries.
Eroglu TE(1)(2)(3), Barcella CA(3), Blom MT(1), Souverein PC(2), Mohr GH(3), Torp-Pedersen C(3)(4)(5), Folke F(3)(6), Wissenberg M(3)(6), de Boer A(2), Gislason GH(3)(7)(8), Tan HL(1)(9); ESCAPE-NET Investigators.
ABSTRACT
AIM: Opioid use has substantially increased in the last decade and is associated with overdose mortality, but also with increased mortality from cardiovascular causes. This finding may partly reflect an association between opioids and out-of-hospital cardiac arrest (OHCA). Therefore, we aimed to investigate OHCA-risk of opioids in the community. METHODS: We conducted two population-based case-control studies separately in the Netherlands (2009-2018) and Denmark (2001-2015). Cases were individuals who experienced OHCA of presumed cardiac cause. Each case was matched with up to five non-OHCA-controls according to age, sex and OHCA-date. Conditional logistic regression analysis was used to calculate odds ratios (OR) and 95% confidence intervals (CI). RESULTS: We included 5,473 OHCA-cases matched with 21,866 non-OHCA-controls in the Netherlands, and 35,017 OHCA-cases matched with 175,085 non-OHCA-controls in Denmark. We found that use of opioids (the Netherlands: cases: 5.4%, controls: 1.8%; Denmark: cases: 11.9%, controls: 4.4%) was associated with increased OHCA-risk in both regions (the Netherlands: OR 2.1 [95%-CI 1.8-2.5]; Denmark: OR 1.8 [95%-CI 1.5-2.1]). The association was observed in both sexes, and in individuals with cardiovascular disease (the Netherlands: OR 1.8 [95%-CI 1.5-2.1]; Denmark: OR 1.6 [95%-CI 1.5-1.7]) or without (the Netherlands: OR 3.4 [95%-CI: 2.4-4.8], P-interaction<0.0001; Denmark: OR 2.3 [95%-CI: 2.0-2.5], P-interaction<0.0001). CONCLUSION: Use of opioids is associated

with increased OHCA-risk in both sexes, independently of concomitant cardiovascular disease. These findings should be considered when evaluating the harms and benefits of treatment with opioids.

2. Clin Case Rep. 2021 Nov 19;9(11):e05042. doi: 10.1002/ccr3.5042. eCollection 2021 Nov.
Cardiac arrest following cardiac tamponade caused by mycosis fungoides malignant pericarditis.
Sato S(1), Tanaka E(2).
ABSTRACT
Mycosis fungoides is a low-grade lymphoma, but on reaching the tumor stage, it can cause cardiac tamponade owing to epicardial infiltration. Myocardial infiltration, even in the absence of abnormal imaging findings, requires attention because it can lead to arrhythmia and cardiac arrest.

3. J Am Heart Assoc. 2021 Nov 24:e021170. doi: 10.1161/JAHA.121.021170. Online ahead of print.
Confirmation of Cause of Death Via Comprehensive Autopsy and Whole Exome Molecular Sequencing in People With Epilepsy and Sudden Unexpected Death.
Chahal CAA(1)(2)(3)(4), Tester DJ(3)(5), Fayyaz AU(3)(6), Jaliparthy K(3)(7)(8), Khan NA(7), Lu D(3)(8), Khan M(3), Sahoo A(8), Rajendran A(3), Knight JA(8), Simpson MA(9), Behr ER(10)(11), So EL(12), St Louis EK(8)(12)(13), Reichard RR(6), Edwards WD(6), Ackerman MJ(14), Somers VK(3)(8).
ABSTRACT
Background Sudden cardiac arrest is the leading mode of death in the United States. Epilepsy affects 1% of Americans; yet epidemiological data show a prevalence of 4% in cases of sudden cardiac arrest. Sudden unexpected death in epilepsy (SUDEP) may share features with sudden cardiac arrest. The objective of this study was to report autopsy and genomic findings in a large cohort of SUDEP cases. Methods and Results Mayo Clinic Sudden Death Registry containing cases (ages 0-90 years) of sudden unexpected and unexplained deaths 1960 to present was queried. Exome sequencing performed on decedent cases. From 13 687 cases of sudden death, 656 (4.8%) had a history of seizures, including 368 confirmed by electroencephalography, 96 classified as SUDEP, 58 as non-SUDEP, and 214 as unknown (insufficient records). Mean age of death in SUDEP was 37 (±19.7) years; 56 (58.3%) were male; 65% of deaths occurred at night; 54% were found in bed; and 80.6% were prone. Autopsies were obtained in 83 cases; bystander coronary artery disease was frequently reported as cause of death; nonspecific fibrosis was seen in 32.6% of cases, in structurally normal hearts. There were 4 cases of Dravet syndrome with pathogenic variants in SCN1A gene. Using whole exome sequencing in 11 cases, 18 ultrarare nonsynonymous variants were identified in 6 cases including CACNB2, RYR2, CLNB, CACNA1H, and CLCN2. Conclusions This study examined one of the largest single-center US series of SUDEP cases. Several cases were reclassified as SUDEP, 15% had an ECG when alive, and 11 (11.4%) had blood for whole exome sequencing analysis. The most frequent antemortem genetic finding was pathogenic variants in SCN1A; postmortem whole exome sequencing identified 18 ultrarare variants.

4. Cardiovasc Revasc Med. 2021 Nov 20:S1553-8389(21)00746-6. doi: 10.1016/j.carrev.2021.11.019. Online ahead of print.
Sudden cardiac arrest during the immediate revascularization period in patients with non-ST elevation myocardial infarction: A case series.
Olanipekun T(1), Abe T(2), Igwe J(2), Effoe V(3), Egbuche O(4), Chris-Olaiya A(5), Snyder R(6).
ABSTRACT
INTRODUCTION: The timing of sudden cardiac arrest (SCA) after myocardial infarction (MI) has been a subject of research because of the impact on preventive strategies. Currently, there is limited data on the risk of SCA in the immediate post revascularization period (≤48 h) in non-ST segment elevation myocardial infarction (NSTEMI). METHODS: We retrospectively reviewed the electronic

medical record system and identified patients who underwent revascularization for NSTEMI at Grady Memorial Hospital, Atlanta, Georgia between January 1st, 2014-December 31st, 2019. We selected patients who had SCA within 48 h of revascularization and evaluated their socio-demographic and inpatient characteristics and outcomes. RESULTS: Sixteen (16) cases of SCA in the immediate post revascularization period (within 48 h) were identified and analyzed which corresponds to an incidence rate of 1.8% (n = 16/869). The mean age (SD) was 69 years (14.6) and 75% were males. On angiography, more than 80% of the patients had hemodynamically significant lesions in the left anterior descending arteries and its territories and 50% had multivessel disease. All 16 patients had at least one coronary artery with hemodynamically significant lesion and successfully underwent revascularization. Three-quarter of the patients had a shockable rhythm. The etiology of SCA was in-stent thrombosis in 25% of the patients, cardiogenic shock in 19%, acute respiratory failure in 13% and unknown in 44% of the cases. The 30-day mortality rate was 38%. CONCLUSION: The rate of SCA is high in the first 48 h after MI even with revascularization. Risk stratification for SCA during this critical period may improve outcomes.

END-TIDAL CO_2

1. Resuscitation. 2021 Nov 23:S0300-9572(21)00471-8. doi: 10.1016/j.resuscitation.2021.11.017. Online ahead of print.
Hemodynamic-directed Pediatric Cardiopulmonary Resuscitation using ET-CO2: Are Physiologic Targets Really Patient Centric?
Lauridsen KG(1), Raymond T(2), Sutton RM(3).
NO ABSTRACT AVAILABLE

ORGAN DONATION

1. Ann Transplant. 2021 Nov 23;26:e934345. doi: 10.12659/AOT.934345.
The Future Direction of the Organ Donation System After Legislation of the Life-Sustaining Treatment Decision Act.
Baik SM(1), Park J(2), Kim TY(3), Lee JH(4), Hong KS(3).
ABSTRACT
BACKGROUND The transplant community is seeking ways to encourage organ donation after cardiac arrest to solve the problem of the insufficiency of organs available for the increasing number of people awaiting transplantation. This study aimed to determine whether the life-sustaining treatment (LST) decision system, implemented in Korea on February 4, 2018, can address the shortage of organ donations. MATERIAL AND METHODS We retrospectively analyzed the medical records of the 442 patients who had filled out forms for the LST decision at Ewha Womans University Mokdong Hospital from April 2018 to December 2019, and classified the eligibility of organ and tissue donation according to the Korean Organ Donation Agency criteria. RESULTS We included 442 patients in this study. Among them, 238 (53.8%) were men, and 204 (46.2%) were women. The average age of the patients was 71.8 years (the youngest and oldest were aged 23 years and 103 years, respectively). Of these, 110 patients (24.9%) decided on their own to discontinue LST, whereas 332 (75.1%) decided to discontinue with their family's consent. This study demonstrated that 50% of patients who were not brain-dead and discontinued LST were eligible for organ donation. However, the patients and caregivers were not aware of this option because the current law does not allow the discussion of such donations. CONCLUSIONS A discussion regarding donation after circulatory death is recommended to solve the problem of insufficient organ donation.

FEEDBACK

No articles identified.

DRUGS

1. Emerg Med Australas. 2021 Dec;33(6):1088-1094. doi: 10.1111/1742-6723.13841. Epub 2021 Aug 11.

Time to amiodarone administration and survival outcomes in refractory ventricular fibrillation.

Wissa J(1)(2), Schultz BV(1), Wilson D(1), Rashford S(1), Bosley E(1)(3), Doan TN(1).

ABSTRACT

OBJECTIVE: International guidelines recommend amiodarone for out-of-hospital cardiac arrest (OHCA) in refractory ventricular fibrillation (VF). While early appropriate interventions have been shown to improve OHCA survival, the association between time to amiodarone and survival remains to be established. METHODS: Included were adult OHCA in refractory VF, between January 2015 and December 2019, who received a resuscitation attempt with amiodarone from Queensland Ambulance Service paramedics. Patient characteristics and survival outcomes were described. Factors associated with survival were investigated, with a focus on time from arrest to amiodarone administration. Optimal time window for amiodarone administration was determined, and factors influencing whether amiodarone was given within the optimal time window were examined. RESULTS: A total of 502 patients were included. The average (range) time from arrest to amiodarone was 25 (4-83) min. Time to amiodarone was negatively associated with survival (adjusted odds ratio 0.93 for event survival; 95% confidence interval 0.89-0.97). The optimal time window for amiodarone was within 23 min following arrest. Patients receiving amiodarone within the optimal time had significantly better survival than those receiving it outside this window (event survival 38.3% vs 20.6%, $P < 0.001$; discharge survival 25.5% vs 9.7%, $P < 0.001$; 30-day survival 25.1% vs 9.7%, $P < 0.001$). Paramedic response time (adjusted odds ratio 0.96; 95% confidence interval 0.92-0.99) and time from arrest to intravenous access (0.71; 0.67-0.76) were independent factors determining whether patients received amiodarone within the optimal time. CONCLUSIONS: Earlier amiodarone administration was associated with improved survival. Strategies aimed at reducing delay to amiodarone administration have the potential to improve outcome.

TRAUMA

1. BMC Emerg Med. 2021 Nov 23;21(1):148. doi: 10.1186/s12873-021-00542-z.

Survival after traumatic out-of-hospital cardiac arrest in Vietnam: a multicenter prospective cohort study.

Do SN(#)(1)(2)(3), Luong CQ(#)(4)(5)(6), Pham DT(7), Nguyen MH(8), Ton TT(9), Hoang QTA(10), Nguyen DT(1)(2), Pham TTN(11)(12), Hoang HT(13)(14), Khuong DQ(1), Nguyen QH(1)(2), Nguyen TA(1)(2), Tran TT(1), Vu LD(1), Van Nguyen C(1)(2), McNally BF(15)(16), Ong MEH(17)(18), Nguyen AD(1)(2).

ABSTRACT

BACKGROUND: Pre-hospital services are not well developed in Vietnam, especially the lack of a trauma system of care. Thus, the prognosis of traumatic out-of-hospital cardiac arrest (OHCA) might differ from that of other countries. Although the outcome in cardiac arrest following trauma is dismal, pre-hospital resuscitation efforts are not futile and seem worthwhile. Understanding the

country-specific causes, risk, and prognosis of traumatic OHCA is important to reduce mortality in Vietnam. Therefore, this study aimed to investigate the survival rate from traumatic OHCA and to measure the critical components of the chain of survival following a traumatic OHCA in the country. METHODS: We performed a multicenter prospective observational study of patients (> 16 years) presenting with traumatic OHCA to three central hospitals throughout Vietnam from February 2014 to December 2018. We collected data on characteristics, management, and outcomes of patients, and compared these data between patients who died before hospital discharge and patients who survived to discharge from the hospital. RESULTS: Of 111 eligible patients with traumatic OHCA, 92 (82.9%) were male and the mean age was 39.27 years (standard deviation: 16.38). Only 5.4% (6/111) survived to discharge from the hospital. Most cardiac arrests (62.2%; 69/111) occurred on the street or highway, 31.2% (29/93) were witnessed by bystanders, and 33.7% (32/95) were given cardiopulmonary resuscitation (CPR) by a bystander. Only 29 of 111 patients (26.1%) were taken by the emergency medical services (EMS), 27 of 30 patients (90%) received pre-hospital advanced airway management, and 29 of 53 patients (54.7%) were given resuscitation attempts by EMS or private ambulance. No significant difference between patients who died before hospital discharge and patients who survived to discharge from the hospital was found for bystander CPR (33.7%, 30/89 and 33.3%, 2/6, P > 0.999; respectively) and resuscitation attempts (56.3%, 27/48, and 40.0%, 2/5, P = 0.649; respectively). CONCLUSION: In this study, patients with traumatic OHCA presented to the ED with a low rate of EMS utilization and low survival rates. The poor outcomes emphasize the need for increasing bystander first-aid, developing an organized trauma system of care, and developing a standard emergency first-aid program for both healthcare personnel and the community.

VENTILATION

1. Singapore Med J. 2021 Nov 19. doi: 10.11622/smedj.2021197. Online ahead of print.
Laryngeal mask airway in out-of-hospital cardiac arrest.
Tang YN(1), Lui CT(1), Fung HT(1), Lee LY(2), Lau CL(3).
NO ABSTRACT AVAILABLE

2. BMC Emerg Med. 2021 Nov 20;21(1):144. doi: 10.1186/s12873-021-00533-0.
Drug-free tracheal intubation by specialist paramedics (critical care) in a United Kingdom ambulance service: a service evaluation.
Houghton Budd S(1), Alexander-Elborough E(2), Brandon R(2), Fudge C(2), Hardy S(2), Hopkins L(2), Paul B(2), Philips S(2), Thatcher S(2), Winsor P(2).
ABSTRACT
BACKGROUND: Drug-free tracheal intubation has been a common intervention in the context of out-of-hospital cardiac arrest for many years, however its use by paramedics has recently been the subject of much debate. Recent international guidance has recommended that only those achieving high tracheal intubation success should continue to use it. METHODS: We conducted a retrospective service evaluation of all drug-free tracheal intubation attempts by specialist paramedics (critical care) from South East Coast Ambulance Service NHS Foundation Trust between 1st January and 31st December 2019. Our primary outcome was first-pass success rate, and secondary outcomes were success within two attempts, overall success, Cormack-Lehane grade of view, and use of bougie. RESULTS: There were 663 drug-free tracheal intubations and following screening, 605 were reviewed. There was a first-pass success rate of 81.5%, success within two attempts of 96.7%, and an overall success rate of 98.35%. There were ten unsuccessful attempts (1.65%). Bougie use was documented in 83.4% on the first attempt, 93.5% on the second attempt and 100% on the third attempt, CONCLUSION: Specialist paramedics (critical care) are able to deliver drug-free tracheal

intubation with good first-pass success and high overall success and are therefore both safe and competent at this intervention.

CERERBRAL MONITORING

1. J Clin Med. 2021 Nov 18;10(22):5385. doi: 10.3390/jcm10225385.
Different Stratification of Physiological Factors Affecting Cerebral Perfusion Pressure in Hypoxic-Ischemic Brain Injury after Cardiac Arrest According to Visible or Non-Visible Primary Brain Injury: A Retrospective Observational Study.
Kang C(1), Jeong W(1), Park JS(1)(2), You Y(1), Min JH(2)(3), Cho YC(1), Ahn HJ(1)(2), In YN(2)(3), Lee IH(4).
ABSTRACT
We aimed to explore the stratification of physiological factors affecting cerebral perfusion pressure, including arterial oxygen tension, arterial carbon dioxide tension, mean arterial pressure, intracranial pressure (ICP), and blood-brain barrier (BBB) status, with respect to primary or secondary brain injury (PBI or SBI) after out-of-hospital cardiac arrest (OHCA). Among the retrospectively enrolled 97 comatose OHCA survivors undergoing post-cardiac arrest (PCA) care, 46 (47.4%) with already established PBI (high signal intensity (HSI) on diffusion-weighted imaging (DWI) had higher ICP ($p = 0.02$) and poorer BBB status ($p < 0.01$) than the non-HSI group. On subgroup analysis within the non-HSI group to exclude the confounding effect of already established PBI, 40 (78.4%) patients with good neurological outcomes had lower ICP at 24 h (11.0 vs. 16.0 mmHg, $p < 0.01$) and more stable BBB status ($p = 0.17$ in pairwise comparison) compared to those with poor neurological outcomes, despite the non-significant differences in other physiological factors. OHCA survivors with HSI on DWI showed significantly higher ICP and poorer BBB status at baseline before PCA care than those without HSI. Despite the negative DWI findings before PCA care, OHCA survivors have a cerebral penumbra at risk for potentially leading the poor neurological outcome from unsuppressed SBI, which may be associated with increased ICP and BBB permeability.

2. Resuscitation. 2021 Nov 23:S0300-9572(21)00477-9. doi: 10.1016/j.resuscitation.2021.11.023. Online ahead of print.
Prevalence of anxiety, depression, and post-traumatic stress disorder after cardiac arrest: A systematic review and meta-analysis.
Yu Leon Yaow C(1), En Teoh S(1), Shyann Lim W(1), Shi Qi Wang R(1), Xuan Han M(2), Pin Pek P(3), Yong-Qiang Tan B(4), Eng Hock Ong M(5), Xiang Ng Q(6), Fu Wah Ho A(7).
ABSTRACT
AIM: Quality of life after surviving out-of-hospital cardiac arrest (OHCA) is poorly understood, and the risk to mental health is not well understood. We aimed to estimate the prevalence of anxiety, depression, and post-traumatic stress disorder (PTSD) following OHCA. METHODS: In this systematic review and meta-analysis, databases (MEDLINE, EMBASE, and PsycINFO) were searched from inception to May 3, 2021, for studies reporting the prevalence of depression, anxiety, and PTSD among OHCA survivors. Data abstraction and quality assessment were conducted by two authors independently, and a third resolved discrepancies. A single-arm meta-analysis of proportions was conducted to pool the proportion of patients with these conditions at the earliest follow-up time point in each study and at predefined time points. Meta-regression was performed to identify significant moderators that contributed to between-study heterogeneity. RESULTS: The search yielded 15,366 articles. 13 articles were included for analysis, which comprised 186,160 patients. The pooled overall prevalence at the earliest time point of follow-up was 19.0% (11 studies; 95% confidence interval [CI] = 11.0%-30.0%) for depression, 26.0% (nine studies; 95% CI = 16.0%-39.0%)

for anxiety, and 20.0% (three studies; 95% CI = 3.0%-65.0%) for PTSD. Meta-regression showed that the age of patients and proportion of female sex were non-significant moderators. CONCLUSION: The burden of mental health disorders is high among survivors of OHCA. There is an urgent need to understand the predisposing risk factors and develop preventive strategies.

3. Resuscitation. 2021 Nov 22:S0300-9572(21)00465-2. doi: 10.1016/j.resuscitation.2021.11.012. Online ahead of print.

Effects of pre-hospital re-arrest on outcomes based on transfer to a heart attack centre in patients with out-of-hospital cardiac arrest.

Yoon H(1), Ok Ahn K(2), Ho Park J(1), Young Lee S(3).

ABSTRACT

AIM: We aimed to investigate the interaction effects between transfer to a heart attack centre [HAC] and prehospital re-arrest on the clinical outcomes of patients with out-of-hospital cardiac arrest [OHCA]. METHODS: We included adult patients with OHCA of presumed cardiac aetiology from January 2012 to December 2018. The main exposure variable was prehospital re-arrest, defined as recurrence of cardiac arrest with a loss of palpable pulse upon hospital arrival. The other exposure variable was the resuscitation capacity of the receiving hospital [HAC or Non-HAC]. The outcome variable was neurological recovery. A multivariable logistic regression was performed to determine the interaction effects. RESULTS: The final analysis included 6,935 patients. Of these, 21.9% (n=1,521) experienced prehospital re-arrest, whereas 41.3% (n=2,866) were transferred to a non-HAC. The prehospital re-arrest group associated with poor neurological recovery (adjusted odds ratio [AOR], 0.25; 95% confidence interval [CI], 0.21-0.29;). Transfer to an HAC had beneficial effects on neurological recovery (AOR, 3.40 [95% CI, 3.04-3.85]. In the interaction model, wherein prehospital re-arrest patients who were transferred to a non-HAC were used as reference, the AOR of prehospital re-arrest patients who were transferred to an HAC, non-re-arrest patients who were transferred to a non-HAC, and non-re-arrest patients who were transferred to a non-HAC was 2.41 (95% CI, 1.73-3.35), 3.09 (95% CI, 2.33-4.10), and 11.07 (95% CI, 8.40-14.59) respectively (interaction p=0.001). CONCLUSION: Transport to an HAC interacted with prehospital re-arrest was beneficial to clinical outcomes of patients who achieved prehospital ROSC after OHCA.

4. Resusc Plus. 2021 Nov 9;8:100175. doi: 10.1016/j.resplu.2021.100175. eCollection 2021 Dec.

Neurological outcomes of out-of-hospital cardiac arrest occurring in Tokyo train and subway stations.

Miyako J(1), Nakagawa K(2), Sagisaka R(1)(3)(4), Tanaka S(1)(5), Takeuchi H(2), Takyu H(2), Tanaka H(1)(2).

ABSTRACT

OBJECTIVES: The purpose of this study was to identify a relationship between the background environment, bystander and emergency medical services intervention, and favourable neurological outcomes (CPC1-2) one-month after out-of-hospital cardiac arrest (OHCA) occurred at Tokyo train and subway stations. METHODS: This retrospective observational study used OHCA data between 2014 and 2018 that occurred at train stations in Tokyo. The eligible 954 patients were analysed for correlation between background, time frame, and location. Multivariable logistic regression models were used to estimate factors associated with CPC1-2 in patients with cardiogenic OHCA. RESULTS: A total of 886 OHCA cases, cardiogenic (n=562) and non-cardiogenic (n=324), met the inclusion criteria. Of the cardiogenic cases, 71.9% occurred at the platform and on-a-train. One-month CPC1-2 was achieved in 32.0% of cardiogenic OHCAs, which included 47.3% during morning rush hour, 24.7% during daytime hours, 40.2% during evening rush hour, and 20.5% during night-time/early

morning hours. CPC1-2 had significant correlation with morning rush hour (adjusted odds ratio [AOR],4.52; 95% confidence interval [CI], 1.09-18.78), evening rush hour (AOR, 6.85; 95% CI, 1.51-31.15), public access defibrillation (AOR, 5.19; 95% CI, 1.38-19.51), and ventricular fibrillation or pulseless ventricular tachycardia (AOR, 7.56; 95% CI, 1.35-42.43). CONCLUSION: A total of 71.9% of cardiogenic OHCAs occurred at platforms and on trains. To improve neurological outcomes of OHCAs at stations, AED installations on train platforms are necessary. Additionally, using artificial intelligence-based platform monitoring for early detection of OHCAs and offering CPR training are required.

5. Medicines (Basel). 2021 Nov 17;8(11):72. doi: 10.3390/medicines8110072.
Neuron-Specific Enolase (NSE) Predicts Long-Term Mortality in Adult Patients after Cardiac Arrest: Results from a Prospective Trial.
Müller J(1), Bissmann B(1), Becker C(1)(2)(3), Beck K(1), Loretz N(1), Gross S(1), Amacher SA(1)(4), Bohren C(1), Pargger H(3)(4), Tisljar K(3)(4), Sutter R(3)(4), Marsch S(3)(4), Hunziker S(1)(3).
ABSTRACT
BACKGROUND: We investigated whether Neuron-specific enolase (NSE) serum concentration predicts long-term mortality and poor neurological outcome in adult cardiac arrest patients. METHODS: Within this prospective observational study, we included consecutive adult patients admitted to the intensive care unit (ICU) after cardiac arrest. NSE was measured upon ICU admission and on days 1, 2, 3, 5 and 7. RESULTS: Of 403 patients, 176 (43.7%) survived. Median follow-up duration was 43.7 months (IQR 14.3 to 63.0 months). NSE levels on day 3 were increased more than threefold in non-survivors compared to survivors (median NSE (ng/mL) 19.8 (IQR 15.7 to 27.8) vs. 72.6 (IQR 26 to 194)) and showed the highest prognostic performance for mortality compared to other days of measurement, with an AUC of 0.81 and an adjusted hazard ratio of 1.55 (95% CI 1.41 to 1.71, $p < 0.001$). Subgroup analysis showed an excellent sensitivity and negative predictive value of 100% of NSE in patients <54 years of age. CONCLUSION: NSE measured three days after cardiac arrest is associated with long-term mortality and neurological outcome and may provide prognostic information that improves clinical decision making. Particularly in the subgroup of younger patients (<54 years), NSE showed excellent negative predictive value.

6. BMC Neurol. 2021 Nov 22;21(1):456. doi: 10.1186/s12883-021-02480-6.
Prognostication of neurologic outcome using gray-white-matter-ratio in comatose patients after cardiac arrest.
Kirsch K(1), Heymel S(2), Günther A(3), Vahl K(4), Schmidt T(5), Michalski D(6), Fritzenwanger M(2), Schulze PC(7), Pfeifer R(2).
ABSTRACT
BACKGROUND: This study aimed to assess the prognostic value regarding neurologic outcome of CT neuroimaging based Gray-White-Matter-Ratio measurement in patients after resuscitation from cardiac arrest. METHODS: We retrospectively evaluated CT neuroimaging studies of 91 comatose patients resuscitated from cardiac arrest and 46 non-comatose controls. We tested the diagnostic performance of Gray-White-Matter-Ratio compared with established morphologic signs of hypoxic-ischaemic brain injury, e. g. loss of distinction between gray and white matter, and laboratory parameters, i. e. neuron-specific enolase, for the prediction of poor neurologic outcomes after resuscitated cardiac arrest. Primary endpoint was neurologic function assessed with cerebral performance category score 30 days after the index event. RESULTS: Gray-White-Matter-Ratio showed encouraging interobserver variability (ICC 0.670 [95% CI: 0.592-0.741] compared to assessment of established morphologic signs of hypoxic-ischaemic brain injury (Fleiss kappa 0.389 [95% CI: 0.320-0.457]) in CT neuroimaging studies. It correlated with cerebral performance category

score with lower Gray-White-Matter-Ratios associated with unfavourable neurologic outcomes. A cut-off of 1.17 derived from the control population predicted unfavourable neurologic outcomes in adult survivors of cardiac arrest with 100% specificity, 50.3% sensitivity, 100% positive predictive value, and 39.3% negative predictive value. Gray-White-Matter-Ratio prognostic power depended on the time interval between circulatory arrest and CT imaging, with increasing sensitivity the later the image acquisition was executed. CONCLUSIONS: A reduced Gray-White-Matter-Ratio is a highly specific prognostic marker of poor neurologic outcomes early after resuscitation from cardiac arrest. Sensitivity seems to be dependent on the time interval between circulatory arrest and image acquisition, with limited value within the first 12 h.

ULTRASOUND AND CPR

1. J Clin Med. 2021 Nov 9;10(22):5218. doi: 10.3390/jcm10225218.
U SO CARE-The Impact of Cardiac Ultrasound during Cardiopulmonary Resuscitation: A Prospective Randomized Simulator-Based Trial.
Zöllner K(1), Sellmann T(2)(3), Wetzchewald D(1), Schwager H(1), Cleff C(4), Thal SC(3), Marsch S(5).
ABSTRACT
BACKGROUND: Actual cardiopulmonary resuscitation (CPR) guidelines recommend point-of-care ultrasound (POCUS); however, data on POCUS during CPR are sparse and conflicting. This randomized trial investigated the effects of POCUS during CPR on team performance and diagnostic accuracy. METHODS: Intensive Care and Emergency Medicine residents performed CPR with or without available POCUS in simulated cardiac arrests. The primary endpoint was hands-on time. Data analysis was performed using video recordings. RESULTS: Hands-on time was 89% (87-91) in the POCUS and 92% (89-94) in the control group (difference 3, 95% CI for difference 2-4, $p < 0.001$). POCUS teams had delayed defibrillator attachments (33 vs. 26 sec, $p = 0.017$) and first rhythm analysis (74 vs. 52 sec, $p = 0.001$). Available POCUS was used in 71%. Of the POCUS teams, 3 stated a POCUS-derived diagnosis, with 49 being correct and 42 followed by a correct treatment decision. Four teams made a wrong diagnosis and two made an inappropriate treatment decision. CONCLUSIONS: POCUS during CPR resulted in lower hands-on times and delayed rhythm analysis. Correct POCUS diagnoses occurred in 52%, correct treatment decisions in 44%, and inappropriate treatment decisions in 2%. Training on POCUS during CPR should focus on diagnostic accuracy and maintenance of high-quality CPR.

ORGANISATION AND TRAINING

1. Resusc Plus. 2021 Dec;8:100180. doi: 10.1016/j.resplu.2021.100180. Epub 2021 Nov 13.
Simulation and evaluation of the protective barrier enclosure for cardiopulmonary resuscitation.
Jamaludin FH(1), Fathil SM(2), Wong TW(1), Termizi MS(3), Hsu SH(4), Lai HY(5).
ABSTRACT
INTRODUCTION: The COVID-19 pandemic has presented a significant challenge for infection prevention and control during airway management in anaesthesia and critical care. The protective barrier enclosure has been described and studied particularly for perioperative anaesthesia use. The potential use of the protective barrier enclosure during cardiopulmonary resuscitation has been poorly explored in the current literature. This work aims to demonstrate the potential of protective barrier enclosure in limiting aerosol dispersion during cardiopulmonary resuscitation delivery. METHODS: A proof-of-concept simulation study was conducted to evaluate the protective properties of the protective barrier enclosure during cardiopulmonary resuscitation. Aerosol was simulated

using a fluorescent dye trapped within the manikin. Three different methods of cardiopulmonary resuscitation delivery with a protective barrier enclosure applied over the manikin's head were conducted. The first method simulated a chest compression only cardiopulmonary resuscitation, the second method also used chest compressions only, with a face mask fitted on the victim, while the third method, the victim was given chest compression and bag-valve-mask ventilation by two rescuers. RESULTS: In the first method, release of aerosol from the manikin's mouth was observed during chest compression, while in second method, most of the aerosol was trapped within the face mask, with only minor leaking. However, when bag-valve-mask ventilation was delivered, the aerosol leaked out at high speed around the bag-valve-mask seal. No aerosol condensation was found outside of the protective barrier enclosure in all scenes. CONCLUSION: Protective barrier enclosure may reduce aerosol exposure to the rescuers during out-of-hospital cardiac arrest.

2. Resuscitation. 2021 Nov 22:S0300-9572(21)00463-9. doi: 10.1016/j.resuscitation.2021.11.010. Online ahead of print.
No more unwitnessed out-of-hospital cardiac arrests in the future thanks to technology.
Scquizzato T(1), Semeraro F(2).
NO ABSTRACT AVAILABLE

3. Resusc Plus. 2021 Nov 9;8:100176. doi: 10.1016/j.resplu.2021.100176. eCollection 2021 Dec.
Calculating real-world travel routes instead of straight-line distance in the community response to out-of-hospital cardiac arrest.
Smith CM(1), Lall R(1), Spaight R(2), Fothergill RT(1)(3), Brown T(1), Perkins GD(1).
ABSTRACT
BACKGROUND: Using straight-line distance to estimate the proximity of public-access Automated External Defibrillators (AEDs) or volunteer first-responders to potential out-of-hospital cardiac arrests (OHCAs) does not reflect real-world travel distance. The difference between estimates may be an important consideration for bystanders and first-responders responding to OHCAs and may potentially impact patient outcome. OBJECTIVES: To explore how calculating real-world travel routes instead of using straight-line distance estimates might impact the community response to OHCA. METHODS: We mapped 4355 OHCA (01/04/2016-31/03/2017) and 2677 AEDs in London (UK), and 1263 OHCA (18/06/2017-17/06/2018) and 4704 AEDs in East Midlands (UK) using ArcGIS mapping software. We determined the distance from OHCAs to the nearest AED using straight-line estimates and real-world travel routes. We mapped locations of potential OHCAs (London: n = 9065, 20/09/2019-22/03/2020; East Midlands: n = 7637, 20/09/2019-17/03/2020) for which volunteer first-responders were alerted by the GoodSAM mobile-phone app, and calculated response distance using straight-line estimates and real-world travel routes. We created Receiver Operating Characteristic (ROC) curves and calculated the Area Under the Curve (AUC) to determine if travel distance predicted whether or not a responder accepted an alert. RESULTS: Real-world travel routes to the nearest AED were (median) 219 m longer (623 m vs 406 m) than straight-line estimates in London, and 211 m longer (568 m vs 357 m) in East Midlands. The identity of the nearest AED changed on 26% occasions in both areas when calculating real-world travel routes. GoodSAM responders' real-world travel routes were (median) 222 m longer (601 m vs 379 m) in London, and 291 m longer (814 m vs 523 m) in East Midlands. AUC statistics for both areas demonstrated that neither straight-line nor real-world travel distance predicted whether or not a responder accepted an alert. CONCLUSIONS: Calculating real-world travel routes increases the estimated travel distance and time for those responding to OHCAs. Calculating straight-line distance may overestimate the benefit of the community response to OHCA.

4. Medicina (Kaunas). 2021 Nov 2;57(11):1194. doi: 10.3390/medicina57111194.

Clinical Sign-Based Rapid Response Team Call Criteria for Identifying Patients Requiring Intensive Care Management in Japan.

Okawa R(1), Yokono T(2), Koyama Y(2), Uchiyama M(2), Oono N(3).

ABSTRACT

Background and Objectives: For effective function of the rapid response system (RRS), prompt identification of patients at a high risk of cardiac arrest and RRS activation without hesitation are important. This study aimed to identify clinical factors that increase the risk of intensive care unit (ICU) transfer and cardiac arrest to identify patients who are likely to develop serious conditions requiring ICU management and appropriate RRS activation in Japan. Materials and Methods: We performed a single-center, case control study among patients requiring a rapid response team (RRT) call from 2017 to 2020. We extracted the demographic data, vital parameters, blood oxygen saturation (SpO2) and the fraction of inspired oxygen (FiO2) from the medical records at the time of RRT call. The patients were divided into two groups to identify clinical signs that correlated with the progression of clinical deterioration. Patient characteristics in the two groups were compared using statistical tests based on the distribution. Receiver operating characteristic (ROC) curve analysis was used to identify the appropriate cut-off values of vital parameters or FiO2 that showed a significant difference between-group. Multivariate logistic regression analysis was used to identify patient factors that were predictive of RRS necessity. Results: We analyzed the data of 65 patients who met our hospital's RRT call criteria. Among the clinical signs in RRT call criteria, respiratory rate (RR) ($p < 0.01$) and the needed FiO2 were significantly increased ($p < 0.01$) in patients with severe disease course. ROC curve analysis revealed RR and needed FiO2 cut-off values of 25.5 breaths/min and 30%. The odds ratio for the progression of clinical deterioration was 40.5 times higher with the combination of RR ≥ 26 breaths/min and needed FiO2 ≥ 30%. Conclusions: The combined use of RR ≥ 26 breaths/min and needed FiO2 ≥ 30% might be valid for identifying patients requiring intensive care management.

POST-CARDIAC ARREST TREATMENTS

1. Resusc Plus. 2021 Nov 9;8:100179. doi: 10.1016/j.resplu.2021.100179. eCollection 2021 Dec.

Dynamic changes of the hemoglobin index during resuscitation in patients with out-of-hospital cardiopulmonary arrest due to freshwater drowning: A retrospective observational study.

Hirose T(1), Sakai T(1), Takegawa R(1), Ohnishi M(2), Tachino J(1), Muratsu A(1), Nakao S(1), Shiozaki T(1).

ABSTRACT

BACKGROUND: The hemoglobin index (HbI) represents the amount of hemoglobin, which reflects the regional tissue blood volume. The HbI is calculated by a regional oxygen saturation monitor. In freshwater drowning, inhaled water is immediately absorbed into the blood causing hemodilution. We hypothesized that this blood dilution could be observed in real time using HbI values in patients with out-of-hospital cardiac arrest (OHCA) due to freshwater drowning. METHODS: In this single-center retrospective, observational study, we examined the HbI in patients with OHCA due to freshwater drowning from April 2015 to May 2020. Patients with OHCA due to hanging were selected as a control group. RESULTS: Thirty-two patients in the freshwater drowning group and 21 in the control group were eligible for inclusion. In the freshwater drowning group, the HbI values in the return of spontaneous circulation (ROSC) group were significantly decreased in comparison to the non-ROSC group (-0.28 [IQR -0.55, -0.12] vs. -0.04 [IQR -0.16, 0.025]; $p = 0.024$). In the control group, the change of HbI during resuscitation in the ROSC and non-ROSC groups was not significantly different (0.11 [IQR -0.3525, 0.4225] vs. -0.02 [IQR -0.14, 0.605]; $p = 0.8228$). In each patient with

ROSC in the freshwater drowning group, the HbI value after ROSC was significantly decreased in comparison to before ROSC (1.2±0.5 vs. 0.9±0.5]; p = 0.0156). In contrast, this difference was not observed in patients with an ROSC in the control group (3.7±1.3 vs. 3.8±1.4]; p = 0.7940). CONCLUSION: Blood dilution induced by freshwater drowning might be detected in real time using the HbI. To prove the validity of this research's result, further prospective large study is needed.

2. Resuscitation. 2021 Nov 22:S0300-9572(21)00466-4. doi: 10.1016/j.resuscitation.2021.11.013. Online ahead of print.
aTriage of post-cardiac arrest patients: to PCI or not to PCI, that is the question.
Nehme Z(1), Stub D(2).
NO ABSTRACT AVAILABLE

TARGETED TEMPERATURE MANAGEMENT

1. Int J Environ Res Public Health. 2021 Nov 11;18(22):11817. doi: 10.3390/ijerph182211817.
The Effect of Therapeutic Hypothermia after Cardiac Arrest on the Neurological Outcome and Survival-A Systematic Review of RCTs Published between 2016 and 2020.
Colls Garrido C(1), Riquelme Gallego B(2)(3), Sánchez García JC(2)(4), Cortés Martín J(2)(4), Montiel Troya M(4)(5), Rodríguez Blanque R(4)(6).
ABSTRACT
Therapeutic hypothermia is a treatment used for patients who have suffered cardiorespiratory arrest and remain conscious after the recovery of spontaneous circulation. However, its effectiveness is controversial. The objective of this systematic review is to summarize the scientific evidence available about the effect of therapeutic hypothermia on neurological status and survival in this type of patients. METHODOLOGY: A primary search in CINAHL, CUIDEN, Pubmed, Web of Science, and Scopus databases was carried out. Randomized clinical trials (RCT) published from 2016 to 2020 were selected. RESULTS: 17 studies were selected for inclusion and most relevant data were extracted. Methodological quality was assessed by the RoB tool. CONCLUSIONS: Although therapeutic hypothermia is a safe technique with few adverse and manageable effects, it has not shown to improve survival rate and neurological status of adult nor pediatric patients. It is possible that its positive effect on neuroprotection could be achieved only by preventing hyperthermia although further investigation is needed.

2. Ann Intensive Care. 2021 Nov 26;11(1):163. doi: 10.1186/s13613-021-00953-y.
Impact of cooling method on the outcome of initial shockable or non-shockable out of hospital cardiac arrest patients receiving target temperature management: a nationwide multicentre cohort study.
Watanabe M(1), Matsuyama T(2), Oe H(1), Sasaki M(1), Nakamura Y(1), Miyamoto Y(1), Okada N(1), Kitamura T(3), Ohta B(1).
ABSTRACT
BACKGROUND: Little is known about the effectiveness of surface cooling (SC) and endovascular cooling (EC) on the outcome of out-of-hospital cardiac arrest (OHCA) patients receiving target temperature management (TTM) according to their initial rhythm. METHODS: We retrospectively analysed data from the Japanese Association for Acute Medicine Out-of-Hospital Cardiac Arrest registry, a multicentre, prospective nationwide database in Japan. For our analysis, OHCA patients aged ≥ 18 years who were treated with TTM between June 2014 and December 2017 were included. The primary outcome was 30-day survival with favourable neurological outcome defined as a Glasgow-Pittsburgh cerebral performance category score of 1 or 2. Cooling methods were divided into the following groups: SC (ice packs, fans, air blankets, and surface gel pads) and EC(endovascular

catheters and any dialysis technique). We investigated the efficacy of the two categories of cooling methods in two different patient groups divided according to their initially documented rhythm at the scene (shockable or non-shockable) using multivariable logistic regression analysis and propensity score analysis with inverse probability weighting (IPW). RESULTS: In the final analysis, 1082 patients were included. Of these, 513 (47.4%) had an initial shockable rhythm and 569 (52.6%) had an initial non-shockable rhythm. The proportion of patients with favourable neurological outcomes in SC and EC was 59.9% vs. 58.3% (264/441 vs. 42/72), and 11.8% (58/490) vs. 21.5% (17/79) in the initial shockable patients and the initial non-shockable patients, respectively. In the multivariable logistic regression analysis, differences between the two cooling methods were not observed among the initial shockable patients (adjusted odd ratio [AOR] 1.51, 95% CI 0.76-3.03), while EC was associated with better neurological outcome among the initial non-shockable patients (AOR 2.21, 95% CI 1.19-4.11). This association was constant in propensity score analysis with IPW (OR 1.40, 95% CI 0.83-2.36; OR 1.87, 95% CI 1.01-3.47 among the initial shockable and non-shockable patients, respectively). CONCLUSION: We suggested that the use of EC was associated with better neurological outcomes in OHCA patients with initial non-shockable rhythm, but not in those with initial shockable rhythm. A TTM implementation strategy based on initial rhythm may be important.

3. Int J Environ Res Public Health. 2021 Nov 12;18(22):11896. doi: 10.3390/ijerph182211896.
Hypothermia Outcome Prediction after Extracorporeal Life Support for Hypothermic Cardiac Arrest Patients: Assessing the Performance of the HOPE Score in Case Reports from the Literature.
Grin N(1), Rousson V(2), Darocha T(3), Hugli O(4), Carron PN(4), Zingg T(5), Pasquier M(4).
ABSTRACT
Aims: The hypothermia outcome prediction after extracorporeal life support (ECLS) score, or HOPE score, provides an estimate of the survival probability in hypothermic cardiac arrest patients undergoing ECLS rewarming. The aim of this study was to assess the performance of the HOPE score in case reports from the literature. Methods: Cases were identified through a systematic review of the literature. We included cases of hypothermic cardiac arrest patients rewarmed with ECLS and not included in the HOPE derivation and validation studies. We calculated the survival probability of each patient according to the HOPE score. Results: A total of 70 patients were included. Most of them (62/70 = 89%) survived. The discrimination using the HOPE score was good (Area Under the Receiver Operating Characteristic Curve = 0.78). The calibration was poor, with HOPE survival probabilities averaging 54%. Using a HOPE survival probability threshold of at least 10% as a decision criterion for rewarming a patient would have resulted in only five false positives and a single false negative, i.e., 64 (or 91%) correct decisions. Conclusions: In this highly selected sample, the HOPE score still had a good practical performance. The selection bias most likely explains the poor calibration found in the present study, with survivors being more often described in the literature than non-survivors. Our finding underscores the importance of working with a representative sample of patients when deriving and validating a score, as was the case in the HOPE studies that included only consecutive patients in order to minimize the risk of publication bias and lower the risk of overly optimistic outcomes.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. R Soc Open Sci. 2021 Nov 10;8(11):210566. doi: 10.1098/rsos.210566. eCollection 2021 Nov.
Machine learning and feature engineering for predicting pulse presence during chest compressions.

Sashidhar D(1)(2), Kwok H(2)(3), Coult J(2)(4), Blackwood J(2), Kudenchuk PJ(2)(5), Bhandari S(2)(4), Rea TD(2)(4), Kutz JN(1)(2).

ABSTRACT

Current resuscitation protocols require pausing chest compressions during cardiopulmonary resuscitation (CPR) to check for a pulse. However, pausing CPR when a patient is pulseless can worsen patient outcomes. Our objective was to design and evaluate an ECG-based algorithm that predicts pulse presence with or without CPR. We evaluated 383 patients being treated for out-of-hospital cardiac arrest with real-time ECG, impedance and audio recordings. Paired ECG segments having an organized rhythm immediately preceding a pulse check (during CPR) and during the pulse check (without CPR) were extracted. Patients were randomly divided into 60% training and 40% test groups. From training data, we developed an algorithm to predict the clinical pulse presence based on the wavelet transform of the bandpass-filtered ECG. Principal component analysis was used to reduce dimensionality, and we then trained a linear discriminant model using three principal component modes as input features. Overall, 38% (351/912) of checks had a spontaneous pulse. AUCs for predicting pulse presence with and without CPR on test data were 0.84 (95% CI (0.80, 0.88)) and 0.89 (95% CI (0.86, 0.92)), respectively. This ECG-based algorithm demonstrates potential to improve resuscitation by predicting the presence of a spontaneous pulse without pausing CPR with moderate accuracy.

2. Acta Cardiol Sin. 2021 Nov;37(6):632-642. doi: 10.6515/ACS.202111_37(6).20210630B.

Utilization of Amplitude-Integrated Electroencephalography to Predict Neurologic Function after Resuscitation in Adults with Cardiogenic Cardiac Arrest.

Wu CI(1)(2), Hsu PF(1)(2)(3), Lee IH(4), Lin YJ(1)(2), Lin CF(5), Pan JP(1), Hsu TF(4), How CK(4), Kwan SY(5), Chung FP(1)(2), Wu CH(1)(2), Chen SA(2)(6).

ABSTRACT

BACKGROUND: Amplitude-integrated electroencephalography (aEEG) has been used as a tool to recognize brain activity in children with hypoxic encephalopathy. OBJECTIVES: To assess the prognostic value of aEEG during the post-resuscitation period of adult cardiogenic cardiac arrest, comatose survivors were monitored within 24 h of a return of spontaneous circulation using aEEG. METHODS: Forty-two consecutive patients experiencing cardiac arrest were retrospectively enrolled, and a return of spontaneous circulation was achieved in all cases. These patients were admitted to the Coronary Intensive Care Unit due to cardiogenic cardiac arrest. The primary outcome was the best neurologic outcome within 6 months after resuscitation, and the registered patients were divided into two groups based on the Cerebral Performance Category (CPC) scale (CPC 1-2, good neurologic function group; CPC 3-5, poor neurologic function group). All patients received an aEEG examination within 24 h after a return of spontaneous circulation, and the parameters and patterns of aEEG recordings were compared. RESULTS: Nineteen patients were in the good neurologic function group, and 23 were in the poor group. The four voltage parameters (minimum, maximum, span, average) of the aEEG recordings in the good neurologic function groups were significantly higher than in the poor group. Moreover, the continuous pattern, but not the status epilepticus or burst suppression patterns, could predict mid-term good neurologic function. CONCLUSIONS: aEEG can be used to predict neurologic outcomes based on the recordings' parameters and patterns in unconscious adults who have experienced a cardiac collapse, resuscitation, and return of spontaneous circulation.

PEDIATRICS AND CHILDREN

1. Anasthesiol Intensivmed Notfallmed Schmerzther. 2021 Dec;56(11-12):760-771. doi: 10.1055/a-1330-5211. Epub 2021 Nov 24.

[Prehospital Resuscitation of Children]. [Article in German]

Kaufmann J, Etspüler A, Wallot P.

ABSTRACT

The majority of professionals involved in pre-hospital emergency care do not have explicit paediatric training and have limited experience in the care of life-threatening paediatric emergencies. There is often a fear of being overwhelmed. However, no special paediatric expertise is primarily required to successfully perform resuscitation in children. In addition, the scope of the measures required for successful paediatric resuscitation is on average significantly smaller than for adults. It is essential to know clear and easy-to-implement courses of action, such as those provided by the resuscitation guidelines. For the technical implementation of airway protection, mask-bag ventilation and the laryngeal mask are essential, and for access to the venous system, the intraosseous needle is an aid that overcomes all difficulties almost without exception. With additional support from reference sources, calculation aids and length-related systems, a high level of drug therapy safety can be achieved. In summary, through thorough individual and institutional preparation for paediatric emergencies, safe primary care is feasible by emergency service personnel of any speciality.

2. Resusc Plus. 2021 Nov 9;8:100181. doi: 10.1016/j.resplu.2021.100181. eCollection 2021 Dec.

Association of subsequent treated shockable rhythm with outcomes after paediatric out-of-hospital cardiac arrests: A nationwide, population-based observational study.

Goto Y(1), Funada A(2), Maeda T(1), Goto Y(3).

ABSTRACT

AIM: Among patients with paediatric out-of-hospital cardiac arrests (OHCAs), most have an initial non-shockable rhythm with poor outcomes. There is a subset who developed shockable rhythms. This study aimed to investigate the association between subsequent shock delivery and outcomes after paediatric OHCAs. METHODS: We analysed records of 19,095 children (aged <18 years) with OHCA and initial non-shockable rhythm. Data were obtained from a Japanese nationwide database for 13 years (2005-2017). The primary outcome measure was 1-month neurologically intact survival, defined as cerebral performance category 1-2. RESULTS: Among patients with pulseless electrical activity (PEA, n = 3,326), there was no significant difference between those with subsequent treated shockable rhythm (10.0% [11/109]) and those with sustained non-shockable rhythm (6.0% [192/3,217], p = 0.10) with respect to the neurologically intact survival rate. Among asystole patients (n = 15,769), the neurologically intact survival rate was significantly higher in the subsequent treated shockable rhythm group (4.4% [10/227]) than in the sustained non-shockable rhythm group (0.7% [106/15,542], p < 0.0001). Subsequent treated shockable rhythm with a shock delivery time (time from emergency medical services [EMS]-initiated cardiopulmonary resuscitation [CPR] to shock delivery) ≤9 min was associated with increased odds of neurologically intact survival compared with sustained non-shockable rhythm (PEA, adjusted odds ratio, 2.45 [95% confidence interval, 1.16-5.16], p = 0.018; asystole, 9.77 [4.2-22.5], p < 0.0001). CONCLUSION: After paediatric OHCAs, subsequent treated shockable rhythm was associated with increased odds of 1-month neurologically intact survival regardless of whether the initial rhythm was PEA or asystole, only when the shock was delivered ≤9 min of EMS-initiated CPR.

3. Resuscitation. 2021 Nov 22:S0300-9572(21)00470-6. doi: 10.1016/j.resuscitation.2021.11.016. Online ahead of print.

Serum levels of the cold stress hormones FGF21 and GDF-15 after cardiac arrest in infants and children enrolled in single center therapeutic hypothermia clinical trials.

Herrmann JR(1), Fink EL(2), Fabio A(3), Au AK(2), Berger RP(4), Janesko-Feldman K(1), Clark RSB(2), Kochanek PM(5), Jackson TC(6).

ABSTRACT

OBJECTIVE: Fibroblast Growth Factor 21 (FGF21) and Growth Differentiation Factor-15 (GDF-15) are putative neuroprotective cold stress hormones (CSHs) provoked by cold exposure that may be age-dependent. We sought to characterize serum FGF21 and GDF-15 levels in pediatric cardiac arrest (CA) patients and their association with use of therapeutic hypothermia (TH). METHODS: Secondary analysis of serum samples from clinical trials. We measured FGF21 and GDF-15 levels in pediatric patients post-CA and compared levels to both pediatric intensive care (PICU) and healthy controls. Post-CA, we compared normothermia (NT) vs TH (33°C for 72h) treated cohorts at <24h, 24h, 48h, 72h, and examined the change in CSHs over 72h. We also assessed association between hospital mortality and initial levels. RESULTS: We assessed 144 samples from 68 patients (27 CA [14 TH, 13 NT], 9 PICU and 32 healthy controls). Median initial FGF21 levels were higher post-CA vs. healthy controls (392 vs. 40pg/mL, respectively, P<0.001). Median GDF-15 levels were higher post-CA vs. healthy controls (7,089 vs. 396pg/mL, respectively, P<0.001). In the CA group, the median change in FGF21 from PICU day 1-3 (after 72h of temperature control), was higher in TH vs. NT (231 vs. -20pg/mL, respectively, P<0.05), with no difference in GDF-15 over time. Serum GDF-15 levels were higher in CA patients that died vs. survived (19,450 vs. 5,337pg/mL, respectively, P<0.05), whereas serum FGF21 levels were not associated with mortality. CONCLUSION: Serum levels of FGF21 and GDF-15 increased after pediatric CA, and FGF21 appears to be augmented by TH.

4. Heart Fail Clin. 2022 Jan;18(1):9-18. doi: 10.1016/j.hfc.2021.07.012. Epub 2021 Oct 22.

The Risk of Sudden Death in Children with Hypertrophic Cardiomyopathy.

Norrish G(1), Kaski JP(2).

ABSTRACT

Sudden cardiac death (SCD) is the most common cause of death in childhood hypertrophic cardiomyopathy (HCM) and occurs more frequently than in adult patients. Risk stratification strategies have traditionally been extrapolated from adult practice, but newer evidence has highlighted important differences between childhood and adult cohorts, with the implication that pediatric-specific risk stratification strategies are required. Current guidelines use cumulative risk factor thresholds to recommend implantable cardioverter defibrillator (ICD) implantation but have been shown to have limited discriminatory ability. Newer pediatric models that allow clinicians to calculate individualized estimates of 5-year risk allowing, for the first time, personalization of ICD implantation decision-making have been developed. This article describes the pathophysiology, risk factors, and approach to risk stratification for SCD in childhood HCM and highlights unanswered questions.

5. Heart Fail Clin. 2022 Jan;18(1):115-123. doi: 10.1016/j.hfc.2021.07.002. Epub 2021 Oct 22.

The Risk of Sudden Unexpected Cardiac Death in Children: Epidemiology, Clinical Causes, and Prevention.

Monda E(1), Lioncino M(1), Rubino M(1), Caiazza M(1), Cirillo A(1), Fusco A(1), Pacileo R(1), Fimiani F(1), Amodio F(1), Borrelli N(1), Colonna D(1), D'Onofrio B(1), Frisso G(2), Drago F(3), Castelletti S(4), Sarubbi B(1), Calabrò P(1), Russo MG(1), Limongelli G(5).

ABSTRACT

"Sudden unexplained death (SUD) is a tragic event for both the family and community, particularly when it occurs in young individuals. Sudden cardiac death (SCD) represents the leading form of SUD

and is defined as an unexpected event without an obvious extracardiac cause, occurring within 1 hour after the onset of symptoms. In children, the main causes of SCD are inherited cardiac disorders, whereas coronary artery diseases (congenital or acquired), congenital heart diseases, and myocarditis are rare. The present review examines the current state of knowledge regarding SCD in children, discussing the epidemiology, clinical causes, and prevention strategies."

EXTRACORPOREAL LIFE SUPPORT

1. Resuscitation. 2021 Nov 22:S0300-9572(21)00469-X. doi: 10.1016/j.resuscitation.2021.11.015. Online ahead of print.

Predictors of poor outcome after extra-corporeal membrane oxygenation for refractory cardiac arrest (ECPR): a post hoc analysis of a multicenter database.

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ABSTRACT

BACKGROUND: The objective was to assess predictors for unfavorable neurological outcome (UO) in out-of-hospital (OHCA) and in-hospital (IHCA) cardiac arrest patients treated with Extracorporeal cardiopulmonary resuscitation (ECPR). METHODS: A post hoc analysis of retrospective data from five European ECPR centers (January 2012-December 2016) was performed. The primary composite endpoint was 3-month UO defined as survival with a cerebral performance category (CPC) of 3-4 or death (CPC 5). RESULTS: A total of 413 patients treated with ECPR were included (median age was 57 [48-65] years, male gender 78%): 61% of patients (n=250) suffered OHCA. The median time from collapse to ECMO placement was 63 [45-82] minutes. Overall, 81% patients (n=333) showed unfavorable UO, which was higher in OHCA patients (90% vs 66%), as compared to IHCA. In OHCA, prolonged time from collapse to ECMO initiation (OR 1.02, p<0.01) and higher ECMO blood flow (OR 1.99, p=0.01) were associated with UO while initial shockable rhythm (OR 0.04, p<0.01), previous heart disease (OR 0.20, p<0.01) and pre-hospital hypothermia (OR 0.08, p<0.01) had a protective role. In IHCA, prolonged time from arrest to ECMO implantation (OR 1.02, p=0.03), high lactate level on admission (OR 1.15, p<0.01) and higher body weight (OR 1.03, p<0.01) were independently associated with UO. CONCLUSIONS: IHCA and OHCA patients receiving ECPR have different predictors of UO at presentation, suggesting that selection criteria for ECPR should be decided according to the location of CA. After ECMO initiation, ECMO blood flow management and mean arterial pressure targets might also impact neurological recovery.

2. Med Klin Intensivmed Notfmed. 2021 Nov 24. doi: 10.1007/s00063-021-00883-4. Online ahead of print.

[Extracorporeal life support (ECLS): 2021 update]. [Article in German]

Staudacher DL(1), Wengenmayer T(1), Boeken U(2), Ghanem A(3), Napp LC(4), Preusch MR(5), Thiele H(6), Michels G(7).

NO ABSTRACT AVAILABLE

EXPERIMENTAL RESEARCH

1. J Am Heart Assoc. 2021 Nov 24:e021071. doi: 10.1161/JAHA.121.021071. Online ahead of print.
Brain Kynurenine Pathway and Functional Outcome of Rats Resuscitated From Cardiac Arrest.
Lucchetti J(1), Fumagalli F(2), Olivari D(2), Affatato R(2), Fracasso C(1), De Giorgio D(2), Perego C(2), Motta F(2), Passoni A(3), Staszewsky L(2), Novelli D(2), Magliocca A(2), Garattini S(4), Latini R(2), Ristagno G(5)(6), Gobbi M(1).

ABSTRACT
Background Brain injury and neurological deficit are consequences of cardiac arrest (CA), leading to high morbidity and mortality. Peripheral activation of the kynurenine pathway (KP), the main catabolic route of tryptophan metabolized at first into kynurenine, predicts poor neurological outcome in patients resuscitated after out-of-hospital CA. Here, we investigated KP activation in hippocampus and plasma of rats resuscitated from CA, evaluating the effect of KP modulation in preventing CA-induced neurological deficit. Methods and Results Early KP activation was first demonstrated in 28 rats subjected to electrically induced CA followed by cardiopulmonary resuscitation. Hippocampal levels of the neuroactive metabolites kynurenine, 3-hydroxy-anthranilic acid, and kynurenic acid were higher 2 hours after CA, as in plasma. Further, 36 rats were randomized to receive the inhibitor of the first step of KP, 1-methyl-DL-tryptophan, or vehicle, before CA. No differences were observed in hemodynamics and myocardial function. The CA-induced KP activation, sustained up to 96 hours in hippocampus (and plasma) of vehicle-treated rats, was counteracted by the inhibitor as indicated by lower hippocampal (and plasmatic) kynurenine/tryptophan ratio and kynurenine levels. 1-Methyl-DL-tryptophan reduced the CA-induced neurological deficits, with a significant correlation between the neurological score and the individual kynurenine levels, as well as the kynurenine/tryptophan ratio, in plasma and hippocampus. Conclusions These data demonstrate the CA-induced lasting activation of the first step of the KP in hippocampus, showing that this activation was involved in the evolving neurological deficit. The degree of peripheral activation of KP may predict neurological function after CA.

2. Resusc Plus. 2021 Nov 11;8:100174. doi: 10.1016/j.resplu.2021.100174. eCollection 2021 Dec.
Use of an end-tidal carbon dioxide-guided algorithm during cardiopulmonary resuscitation improves short-term survival in paediatric swine.
O'Brien CE(1), Santos PT(1), Kulikowicz E(1), Adams S(1), Lee JK(1), Hunt EA(1)(2)(3), Koehler RC(1), Shaffner DH(1).

ABSTRACT
AIM: To evaluate an algorithm that uses an end-tidal carbon dioxide (ETCO2) target of ≥ 30 torr to guide specific changes in chest compression rate and epinephrine administration during cardiopulmonary resuscitation (CPR) in paediatric swine. METHODS: Swine underwent asphyxial cardiac arrest followed by resuscitation with either standard or ETCO2-guided algorithm CPR. The standard group received chest compressions at a rate of 100/min and epinephrine every 4 min during advanced life support consistent with the American Heart Association paediatric resuscitation guidelines. In the ETCO2-guided algorithm group, chest compression rate was increased by 10 compressions/min for every minute that the ETCO2 was < 30 torr, and the epinephrine administration interval was decreased to every 2 min if the ETCO2 remained < 30 torr. Short-term survival and physiologic data during active resuscitation were compared. RESULTS: Short-term survival was significantly greater in the ETCO2-guided algorithm CPR group than in the standard CPR group (16/28 [57.1%] versus 4/28 [14.3%]; p = 0.002). Additionally, the algorithm

group had higher predicted mean ETCO2, chest compression rate, diastolic and mean arterial pressure, and myocardial perfusion pressure throughout resuscitation. Swine in the algorithm group also exhibited significantly greater improvement in diastolic and mean arterial pressure and cerebral perfusion pressure after the first dose of epinephrine than did those in the standard group. Incidence of resuscitation-related injuries was similar in the two groups. CONCLUSIONS: Use of a resuscitation algorithm with stepwise guidance for changes in the chest compression rate and epinephrine administration interval based on a goal ETCO2 level improved survival and intra-arrest hemodynamics in this porcine cardiac arrest model.

3. Int Wound J. 2021 Dec;18(6):874-880. doi: 10.1111/iwj.13589. Epub 2021 May 4.
Changes of fibrinolytic system in thrombolytic resuscitation of pulmonary thromboembolism-induced cardiac arrest model.
Tong N(1), Li C(1).
ABSTRACT
The objective of this study is to explore the changes in the coagulation and fibrinolysis system in an animal model with pulmonary embolism after cardiopulmonary bypass and to provide a theoretical basis for clinical practice. An animal model of cardiac arrest due to pulmonary embolism was established for venous thrombus (10-15 mL) in the left external jugular vein of 21 pigs. Computed tomography (CT) pulmonary arteriography was performed after the recovery of the underlying state, cardiac arrest state and spontaneous circulation, and then thrombolysis and cardiopulmonary resuscitation (recombinant tissue plasminogen activator [t-PA] 50 mg) were performed immediately. The changes of tissue factor (TF), tissue factor pathway inhibitor (TFPI), t-PA and plasminogen activator inhibitor-1 (PAI-1) in the blood were detected by ELISA. The blood samples were collected immediately, 1, 2, 4 and 6 hours after the recovery of spontaneous circulation. Data from animals that were successfully resuscitated at different time points were compared using a repeated measures one-way analysis of variance. Seventeen pigs had cardiac arrest after 10 to 15 mL of thrombus injection, and the other four had cardiac arrest after 5 to 8 mL of additional thrombus. Nine pigs survived 6 hours of cardiopulmonary resuscitation. CT pulmonary angiogram showed pulmonary artery obstruction. TF levels were increased compared with basal status, but there was no statistical difference ($P > .05$). TFPI levels were higher at 1, 2, 4 and 6 hours after recovery of spontaneous circulation compared with basal state ($P < .05$); t-PA levels were higher at cardiac arrest, and immediately after recovery of spontaneous circulation compared with basal state. There was a statistical difference in PAI-1 level at 1, 2, 4 and 6 hours after recovery of spontaneous circulation ($P < .05$). There was no statistical difference in PAI-1 level at each stage compared with basal state ($P > .05$). TFPI has a certain influence on the coagulation and thrombosis regulation of the body, and the increase in fibrinolytic activity has a positive promoting effect on the thrombolysis. It provided the theoretical basis of clinical treatment of thrombotic diseases.

CASE REPORTS

1. J Cardiovasc Dev Dis. 2021 Nov 4;8(11):147. doi: 10.3390/jcdd8110147.
A Unique Case of Inferior Vena Cava Aneurysm Complicated with Pulmonary Embolism and Cerebral Infarction.
Chang H(1), Bae J(1), Chung TN(1).
ABSTRACT
Inferior vena cava (IVC) aneurysms rarely occur. They are commonly detected incidentally since they present with mild or no symptoms. This was the first study to report a fatal case of a saccular IVC

aneurysm with pulmonary embolism and cerebral infarction. The patient developed cardiac arrest five minutes after arriving at the emergency department, and spontaneous circulation was restored after two minutes of cardiopulmonary resuscitation. Computed tomography scans of the brain, chest, and abdomen-pelvis were obtained. The patient was diagnosed with a saccular aneurysm of the IVC measuring 8 × 11 cm, massive embolism of both pulmonary arteries, and cerebral infarction. An electroencephalogram, taken on the third day of hospitalization, suggested brain death, and the patient died on the eleventh day of hospitalization. This case report highlights that an IVC aneurysm with pulmonary embolism can be associated with paradoxical emboli-induced cerebral infarction, which is fatal.

2. JACC Case Rep. 2021 Nov 17;3(16):1769-1773. doi: 10.1016/j.jaccas.2021.08.019. eCollection 2021 Nov 17.

Cardiac Arrest in a Patient With Arrhythmic Mitral Valve Prolapse Syndrome: Multiple Possible Etiologies.

Chivulescu M(1)(2), Aabel E(1)(2), Dejgaard L(1)(2), Steen T(3), Dunlop O(4), Haugaa KH(1)(2).

ABSTRACT

Arrhythmic mitral valve prolapse syndrome is associated with a high risk of death. A 60-year-old man with arrhythmic mitral valve prolapse syndrome was monitored with an implantable loop recorder. Nine months later dyspnea developed, followed by cardiac arrest. Echocardiography showed mitral valve chordal rupture. He underwent successful surgical mitral valve repair.

3. Trauma Case Rep. 2021 Oct 25;36:100548. doi: 10.1016/j.tcr.2021.100548. eCollection 2021 Dec.

Bradycardia resulting in cardiac arrest in a critically ill patient receiving dexmedetomidine.

Bahraini A(1), Banerjee O(1), Ra J(1).

ABSTRACT

Dexmedetomidine is an alpha-2 agonist sedative and analgesic used in anesthesia practice, and it has become more prevalent in the critically ill patients requiring short-term mechanical ventilation. While dexmedetomidine is known to have minimal effects on respiratory drive, it has been well-documented to cause bradycardia and hypotension, especially in patients with existing comorbidities. We present a patient without cardiovascular comorbidities who was in the surgical ICU under dexmedetomidine sedation. The patient went into asystole cardiac arrest after vagal stimulation. Return of spontaneous circulation was achieved using ACLS protocol. We offer a review of reported cases and make recommendations on the management of similar situations that may arise given the increasing use of dexmedetomidine.

4. Acute Med Surg. 2021 Nov 16;8(1):e701. doi: 10.1002/ams2.701. eCollection 2021 Jan-Dec.

Successful interhospital transfer for extracorporeal cardiopulmonary resuscitation of a patient who had a cardiac arrest after cesarean section.

Ijuin S(1), Ishihara S(1), Maemura S(1), Fukushima M(1), Murakami A(2), Inoue A(1), Taniguchi Y(2), Igarashi N(2), Matsuyama S(1), Kawase T(1), Doi T(2), Nakayama S(1).

ABSTRACT

BACKGROUND: Studies describing the effectiveness of extracorporeal cardiopulmonary resuscitation (ECPR) for peripartum cardiopulmonary arrest are lacking. CASE PRESENTATION: A 39-year-old woman underwent elective cesarean section. Right after surgery, she fell into a cardiac arrest and was promptly transferred to our institute by ambulance. On arrival, we immediately initiated ECPR, within 63 min of the cardiac arrest. Return of spontaneous circulation was achieved 80 min after induction of extracorporeal membrane oxygenation. As the hemodynamics of the patient stabilized,

extracorporeal membrane oxygenation was discontinued on day 3 of hospitalization. The patient's cerebral performance category score was 3 at discharge, which improved to 2 after 3 months. CONCLUSION: This case suggests that prompt interhospital transfer and ECPR might be effective for peripartum cardiac arrest due to nonhemorrhagic events.

5. AME Case Rep. 2021 Oct 25;5:31. doi: 10.21037/acr-20-161. eCollection 2021.
Cardiovascular crisis after use of epinephrine: a case report and review of the literature.
Ren Y(1), Wang Y(1), Yan H(1), Chen L(1), Mao Q(1).
ABSTRACT
Diluted epinephrine is often locally used to provide hemostasis and improve visualization. However, rapid absorption or inadvertent intravascular injection of epinephrine can cause unexpected cardiovascular effects. A 28-year-old man was scheduled to undergo a nasal septoplasty. After local application of 0.01% epinephrine-soaked nasal pledgets and infiltration of 3 mL 0.001% epinephrine, the patient developed a severe hypertension of 205/126 mmHg, followed by ventricular tachycardia. Cardiac arrest ensued after intravenous injection of lidocaine and esmolol in an attempt to control ventricular arrhythmia. After successful resuscitation, the patient was transferred to the intensive care unit (ICU) and fully recovered in 5 days. While another two epinephrine-induced hypertension cases were treated smoothly without β-blockers. Although the plausible explanation of this precipitating event is the usage of β-blocker, we reviewed the previous published similar clinical reports and proposed other possible explanations and differential diagnosis. It is important to recognize this potential cardiovascular side-effect in patients administrated with topical and/or submucosal epinephrine. Drugs used to treat hypertension and/or arrhythmia needed to be appreciated.

6. Front Med (Lausanne). 2021 Nov 3;8:731163. doi: 10.3389/fmed.2021.731163. eCollection 2021.
Case Report: Venoarterial Extracorporeal Membrane Oxygenation Support for Caowu-Induced Cardiac Arrest.
Ren B(1), Wang L(2), Chen K(2), Chen L(2), Wang H(3).
ABSTRACT
Introduction: Caowu, the main root of the Aconitum plant, is widely used in China. Aconitine is the main toxic component of Aconitum, which can cause a variety of malignant arrhythmias and lead to death. Four patients who developed malignant arrhythmia after drinking medicinal wine containing Caowu were reported in this study. Cardiac arrest occurred soon after symptom onset. All patients received venoarterial extracorporeal membrane oxygenation (VA-ECMO) support after conservative medical treatment had failed. Patients who were directly transferred to our hospital received VA-ECMO support earlier than patients who were first treated at a local hospital. One patient received hemoperfusion in the emergency room before VA-ECMO support; the other three patients began hemoperfusion after VA-ECMO treatment. Surviving patients who received VA-ECMO earlier after symptom onset showed no obvious neurological complications. The patient who received a longer cardiopulmonary resuscitation time but received hemoperfusion before VA-ECMO had mild neurological complications. The mortality rate was 25% (1 of 4 patients). Two patients had thrombotic complications in venous vessels. Conclusions: Cardiogenic shock due to refractory ventricular tachycardia caused by aconitine is lethal. Conservative supportive treatment did not provide a short-term antiarrhythmic effect and the cardiogenic shock was not well controlled. VA-ECMO treatment combined with hemoperfusion is promising temporary support to successfully treat aconitine-induced cardiogenic shock caused by refractory ventricular tachycardia.