This week's PubMed 20th –26th February 2022: articles of interest n = 51

CPR AND COVID-19

1. Open Access Emerg Med. 2022 Feb 17;14:63-75. doi: 10.2147/OAEM.S340567. eCollection 2022.
Greek BLS Certified Providers' CPR Willingness and Skill Retention During the Pre-Vaccine Covid-19 Pandemic Period. A Survey of the Hellenic Society of Cardiology.
Latsios G(#)(1), Synetos A(#)(1), Leopoulou M(2), Stamatopoulou E(3), Koukopoulos P(4), Parisis C(5), Karanasos A(1), Fragkou P(6), Toutouzas K(1), Kanakakis J(7), Tsioufis K(1).
ABSTRACT
OBJECTIVE: The aim of this study was to evaluate the level of established knowledge regarding cardiopulmonary resuscitation (CPR) during the pre-vaccine Covid-19 pandemic era of certified Basic Life Support (BLS) providers, as well as their attitude towards CPR and their willingness to provide CPR. METHODS: Certified BLS providers from courses held in Athens, Greece, were asked to complete an electronic survey regarding their knowledge of and stance towards performing CPR on victims with confirmed or suspected Covid-19 infection. Their insight on BLS courses was also assessed. Answers were collected during June 2020. RESULTS: Out of 5513 certified providers, 25.53% completed the survey. The majority (83.36%) would provide CPR to a cardiac arrest victim with possible or confirmed Covid-19 infection. Regarding the use of an automated external defibrillator, most respondents anticipated that it is equally safe as in the pre-Covid-19 period (58.24%). A more elementary level of education (p = 0.04) made rescuers more willing to provide CPR. Access to the European Resuscitation Council (ERC) or to the Greek National Public Health Organization (NPHO) guidelines was not correlated to the attitude towards resuscitation. Time since the last BLS seminar had no impact on the rescuers' attitude (p = 0.72). All responders agreed that training in CPR during Covid-19 remains necessary. CONCLUSION: Certified BLS providers maintained their willingness to perform CPR in cardiac arrest victims even during the pre-vaccine, dangerous Covid-19 pandemic period. Knowledge regarding Covid-19 CPR was satisfactory; however, continuous training, focused on the revised algorithms, was considered essential.

2. Scand J Trauma Resusc Emerg Med. 2022 Feb 19;30(1):10. doi: 10.1186/s13049-022-00998-3.
First responder systems can stay operational under pandemic conditions: results of a European survey during the COVID-19 pandemic.
Metelmann C(1), Metelmann B(2), Müller MP(3), Böttiger BW(4), Trummer G(5), Thies KC(6).
ABSTRACT
BACKGROUND: Dispatching first responders (FR) to out-of-hospital cardiac arrest in addition to the emergency medical service has shown to increase survival. The promising development of FR systems over the past years has been challenged by the outbreak of COVID-19. Whilst increased numbers and worse outcomes of cardiac arrests during the pandemic suggest a need for expansion of FR schemes, appropriate risk management is required to protect first responders and patients from contracting COVID-19. This study investigated how European FR schemes were affected by the pandemic and what measures were taken to protect patients and responders from COVID-19. METHODS: To identify FR schemes in Europe we conducted a literature search and a web search. The schemes were contacted and invited to answer an online questionnaire during the second wave of the pandemic (December 2020/ January 2021) in Europe. RESULTS: We have identified 135 FR schemes in 28 countries and included responses from 47 FR schemes in 16 countries. 25 schemes reported deactivation due to COVID-19 at some point, whilst 22 schemes continued to operate throughout the pandemic. 39 schemes communicated a pandemic-specific algorithm to their first responders. Before the COVID-19 outbreak 20 FR systems did not provide any personal protective equipment (PPE). After the outbreak 19 schemes still did not provide any PPE. The majority of

schemes experienced falling numbers of accepted call outs and decreasing registrations of new volunteers. Six schemes reported of FR having contracted COVID-19 on a mission. CONCLUSIONS: European FR schemes were considerably affected by the pandemic and exhibited a range of responses to protect patients and responders. Overall, FR schemes saw a decrease in activity, which was in stark contrast to the high demand caused by the increased incidence and mortality of OHCA during the pandemic. Given the important role FR play in the chain of survival, a balanced approach upholding the safety of patients and responders should be sought to keep FR schemes operational.

3. Circ Cardiovasc Qual Outcomes. 2022 Feb;15(2):e008420. doi: 10.1161/CIRCOUTCOMES.121.008420. Epub 2022 Jan 31.

In-Hospital Cardiac Arrest Survival in the United States During and After the Initial Novel Coronavirus Disease 2019 Pandemic Surge.

Chan PS(1)(2), Spertus JA(1)(2), Kennedy K(1), Nallamothu BK(3), Starks MA(4), Girotra S(5).

ABSTRACT

BACKGROUND: Recent reports on challenges in resuscitation care at hospitals severely affected by the novel coronavirus disease 2019 (COVID-19) pandemic raise questions about how the pandemic affected outcomes for in-hospital cardiac arrest throughout the United States. METHODS: Within Get With The Guidelines-Resuscitation, we conducted a retrospective cohort study to compare in-hospital cardiac arrest survival during the presurge (January 1-February 29), surge (March 1-May 15) and immediate postsurge (May 16-June 30) periods in 2020 compared to 2015 to 2019. Monthly COVID-19 mortality rates for each hospital's county were categorized, per 1 000 000 residents, as low (0-10), moderate (11-50), high (51-100), or very high (>100). Using hierarchical regression models, we compared rates of survival to discharge in 2020 versus 2015 to 2019 for each period. RESULTS: Of 61 586 in-hospital cardiac arrests, 21 208 (4309 in 2020), 26 459 (5949 in 2020), and 13 919 (2686 in 2020) occurred in the presurge, surge, and postsurge periods, respectively. During the presurge period, 24.2% survived to discharge in 2020 versus 24.7% in 2015 to 2019 (adjusted odds ratio, 1.12 [95% CI, 1.02-1.22]). In contrast, during the surge period, 19.6% survived to discharge in 2020 versus 26.0% in 2015 to 2019 (adjusted odds ratio, 0.81 [0.75-0.88]). Lower survival was most pronounced in communities with high (28% lower survival) and very high (42% lower survival) monthly COVID-19 mortality rates (interaction P<0.001). Resuscitation times were shorter (median: 22 versus 25 minutes; P<0.001), and delayed epinephrine treatment was more prevalent (11.3% versus 9.9%; P=0.004) during the surge period. Survival was lower even when patients with confirmed/suspected COVID-19 infection were excluded from analyses. During the postsurge period, survival rates were similar in 2020 versus 2015 to 2019 (22.3% versus 25.8%; adjusted odds ratio, 0.93 [0.83-1.04]), including communities with high COVID-19 mortality (interaction P=0.16). CONCLUSIONS: Early during the pandemic, rates of survival to discharge for IHCA decreased, even among patients without COVID-19 infection, highlighting the early impact of the COVID-19 pandemic on in-hospital resuscitation.

CPR/MECHANICAL CHEST COMPRESSION

1. J Clin Med. 2022 Feb 10;11(4):928. doi: 10.3390/jcm11040928.

Dissemination of Chest Compression-Only Cardiopulmonary Resuscitation by Bystanders for Out-of-Hospital Cardiac Arrest in Students: A Nationwide Investigation in Japan.

Kiyohara K(1), Kitamura Y(2), Ayusawa M(3), Nitta M(4)(5), Iwami T(6), Nakata K(7), Sobue T(2), Kitamura T(2).

ABSTRACT

We aimed to investigate how the types of bystander-initiated cardiopulmonary resuscitation (CPR) for out-of-hospital cardiac arrest (OHCA) among students have changed recently. We also determined the association between two types of bystander-CPRs (i.e., chest compression-only CPR [CCCPR] and conventional CPR with rescue breathing [CCRB]) and survival after OHCA. From a nationwide registry of pediatric OHCAs occurring in school settings in Japan, the data of 253 non-traumatic OHCA patients (elementary, junior high, and high school/technical college students) receiving bystander-CPR between April 2008 and December 2017 were analyzed. Multivariable logistic regression analysis was conducted to assess the impact of different types of bystander-CPR on 30-day survival with favorable neurological outcomes. The proportion of patients receiving CCCPR increased from 25.0% during 2008-2009 to 55.3% during 2016-2017 (p for trend < 0.001). Overall, 53.2% (50/94) of patients receiving CCCPR and 46.5% (74/159) of those receiving CCRB survived for 30 days with favorable neurological outcomes. Multivariable analysis showed no significant difference in outcomes between the two groups (adjusted odds ratio: 1.23, 95% confidence interval: 0.67-2.28). In this setting, CCCPR is a common type of bystander-CPR for OHCA in students, and the effectiveness of CCCPR and CCRB on survival outcomes seems comparable.

REGISTRIES, REVIEWS AND EDITORIALS

1. J Formos Med Assoc. 2022 Feb 23:S0929-6646(22)00044-4. doi: 10.1016/j.jfma.2022.01.024. Online ahead of print.

Characteristics, prognostic factors, and chronological trends of out-of-hospital cardiac arrests with shockable rhythms in Taiwan - A 7-year observational study.

Chi CY(1), Chen YP(2), Yang CW(3), Huang CH(4), Wang YC(4), Chong KM(2), Wang HC(2), Lien WC(2), Yang MF(2), Ma MH(5), Huang CH(2), Chen ZC(6), Ko PC(7).

ABSTRACT

BACKGROUND: The study aimed to explore the characteristics, predictors, and chronological trends of outcomes for adult out-of-hospital cardiac arrests (OHCAs) with shockable rhythms. METHODS: A 7-year, community-wide observational study using an Utstein-style registry was conducted. Patients who were not transported, those who experienced trauma and those who lacked electronic electro-cardiography data were excluded; those with initial shockable rhythms of ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) were included. Outcomes were survival of discharge (SOD) and favorable neurological status (CPC 1-2). The outcome predictors, chronological trends, and their relationship with system interventions were analyzed. RESULTS: Of the 1544 shockable OHCAs (incidence 12.6%) included, 97.6% had VF and 2.4% had pVT. VF showed better outcomes than pVT. Predictors for both outcomes (SOD; CPC 1-2) were chronological change (adjusted odds ratio [aOR]: 1.133; 1.176), younger age (aOR: 0.973; 0.967), shorter response time (aOR: 0.998; 0.999), shorter scene time (aOR: 0.999; 0.999), witnessed collapse (aOR: 1.668; 1.670), and bystander cardio-pulmonary resuscitation (BCPR) (aOR: 1.448; 1.576). Predictors for only SOD were public location (aOR: 1.450) and successful prehospital defibrillation (aOR: 3.374). The use of the supraglottic airway was associated with adverse outcomes. Chronologically with system interventions, BCPR rate, the proportion of shockable OHCA, and improved neurological outcomes increased over time. CONCLUSIONS: The incidence of shockable OHCA remained low in Asian community. VF showed better outcomes than pVT. Over time, the incidence of shockable rhythm, BCPR rate and patient outcomes did improve with health system interventions. The number of prehospital defibrillations did not predict outcomes.

2. EClinicalMedicine. 2022 Feb 12;44:101293. doi: 10.1016/j.eclinm.2022.101293. eCollection 2022 Feb.

Gender disparities among adult recipients of layperson bystander cardiopulmonary resuscitation by location of cardiac arrest in Pan-Asian communities: A registry-based study.

Liu N(1)(2)(3), Ning Y(1), Ong MEH(1)(2)(4), Saffari SE(1)(5), Ryu HH(6), Kajino K(7), Lin CH(8), Karim SA(9), Rao GVR(10), Ho AFW(1)(4), Lim SL(11)(12), Siddiqui FJ(1); PAROS Clinical Research Network Investigators.

ABSTRACT

BACKGROUND: Bystander cardiopulmonary resuscitation (BCPR) is a critical component of the 'chain of survival' in reducing mortality among out-of-hospital cardiac arrest (OHCA) victims. Inconsistent findings on gender disparities among adult recipients of layperson BCPR have been reported in the literature. We aimed to fill this knowledge gap by investigating the extent of gender disparities in a cross-national setting within Pan-Asian communities. METHODS: We utilised data collected from the Pan-Asian Resuscitation Outcomes Study (PAROS), an international, multicentre, prospective study conducted between 2009 and 2018. We included all OHCA cases with non-traumatic arrest aetiology transported by emergency medical services and excluded study sites that did not consistently collect information about the location of cardiac arrest. Logistic regression was used to analyse the association between gender and BCPR, stratified by location. FINDINGS: We analysed a cohort of 56,192 OHCA cases with an overall BCPR rate of 36.2% (20,329/56,192). At public locations, the BCPR rate was 31.2% (631/2022) for female and 36.4% (3235/8892) for male OHCA victims; while at home, the rate was 38.3% (6838/17,842) for females and 35.1% (9625/27,436) for males. Controlling for site differences and several factors in multivariable logistic regression, we found females less likely to receive BCPR than males in public locations (odds ratio [OR]=0.89, 95% confidence interval [CI]: 0.70-0.99), but more likely to receive BCPR at home (OR=1.16, 95% CI: 1.11-1.21). INTERPRETATION: In Pan-Asian communities, gender differences exist in adult recipients of BCPR and differ between home and public locations. Future studies should account for additional information on bystanders and societal factors to identify targets for interventions. FUNDING: The study was supported by grants from the National Medical Research Council (NMRC/CSA/0049/2013) and Laerdal Foundation (20040).

3. Br J Sports Med. 2022 Feb 19:bjsports-2021-105151. doi: 10.1136/bjsports-2021-105151. Online ahead of print.

Better outcomes from exercise-related out-of-hospital cardiac arrest in males and in the young: findings from the Swedish Registry of Cardiopulmonary Resuscitation.

Frisk Torell M(1), Strömsöe A(2), Herlitz J(3), Claesson A(4), Rawshani A(5), Borjesson M(6)(7).

ABSTRACT

BACKGROUND: Survival from out-of-hospital cardiac arrest (OHCA) is higher if the arrest is witnessed and occurs during exercise, however, there is contradicting data on prognosis with regards to sex and age. The purpose of this study was to compare the outcomes and circumstances of exercise-related OHCA in different age groups and between sexes in a large unselected population. METHODS: Data from exercise-related OHCAs reported to the Swedish Registry of Cardiopulmonary Resuscitation from 2011 to 2014 and from 2016 to 2018 were analysed. All cases of exercise-related OHCA in which emergency medical services attempted resuscitation were included. The primary outcome was survival to 30 days. RESULTS: In total, 635 cases of exercise-related OHCA outside of the home were identified. The overall 30-day survival rate was 44.5% with highest survival rate in the age group 0-35 years, compared with 36-65 years and >65 years (59.6% vs 46.0% and 40.4%, p=0.01). A subgroup analysis of 0-25 years showed a survival rate of 68.8%. Exercise-related OHCA in females (9.1% of total) were witnessed to a lower extent (66.7% vs 79.6%, p=0.03) and median time to cardiopulmonary resuscitation (CPR) was longer (2.0 vs 1.0 min, p=0.001) than in males. Females

also had lower rates of ventricular fibrillation (43.4% vs 64.7%, p=0.003) and a lower 30-day survival rate (29.3% vs 46.0%, p=0.02). CONCLUSION: In exercise-related OHCA, younger victims have a higher survival rate. Exercise-related OHCA in females was rare, however, survival rates were lower compared with males and partly explained by a lower proportion of witnessed events, longer time to CPR and lower frequency of a shockable rhythm.

4. J Pers Med. 2022 Feb 7;12(2):233. doi: 10.3390/jpm12020233.
Association between Initial Serum Cholesterol Levels and Outcomes of Patients Hospitalized after Out-of-Hospital Cardiac Arrest: A Retrospective Multicenter Registry Study.
Lee J(1), Lee H(1), Oh J(1), Lim TH(1), Kang H(1), Ko BS(1), Cho Y(1), The Korean Cardiac Arrest Research Consortium KoCARC Investigators(1).
ABSTRACT
PURPOSE: This study aimed to investigate the association between total serum cholesterol levels and outcomes upon discharge in patients after out-of-hospital cardiac arrest (OHCA). METHODS: We performed a retrospective observational study using the Korean Cardiac Arrest Resuscitation Consortium (KoCARC) registry. Patients after OHCA whose total serum cholesterol levels were measured within 24 h after arriving at the emergency department were included in the analysis. The association between total serum cholesterol level and neurological outcomes upon discharge and survival to discharge was estimated. RESULTS: Of the 12,321 patients after OHCA enrolled in the registry from October 2015 to June 2020, 689 patients were included. The poor neurologic outcome upon discharge group had a statistically significant lower total serum cholesterol level compared to the good neurologic outcome group (127.5 ± 45.1 mg/dL vs. 155.1 ± 48.9 mg/dL, $p < 0.001$). As a result of multivariate logistic regression analysis, the odds ratio for the neurologic outcome of total serum cholesterol levels was 2.00 (95% confidence interval [CI] 1.01-3.96, $p = 0.045$). The odds ratio for in-hospital death was 1.72 (95% CI 1.15-2.57, $p = 0.009$). CONCLUSIONS: Low total serum cholesterol levels could be associated with poor neurologic outcomes upon discharge and in-hospital death of patients hospitalized after OHCA.

IN-HOSPITAL CARDIAC ARREST

1. Eur J Anaesthesiol. 2022 Feb 23. doi: 10.1097/EJA.0000000000001676. Online ahead of print.
Incidence, characteristics and predictors of mortality following cardiac arrest in ICUs of a German university hospital: A retrospective cohort study.
Jansen G(1), Sauzet O, Borgstedt R, Entz S, Holland FO, Lamprinaki S, Thies KC, Scholz SS, Rehberg SW.
ABSTRACT
BACKGROUND: Cardiac arrest in intensive care is a rarely studied type of in-hospital cardiac arrest. OBJECTIVE: This study examines the incidence, characteristics, risk factors for mortality as well as long-term prognosis following cardiac arrest in intensive care. DESIGN: Retrospective cohort study. SETTING: Five noncardiac surgical ICUs (41 surgical and 37 medical beds) at a German university hospital between 2016 and 2019. PATIENTS: Adults experiencing cardiac arrest defined as the need for chest compressions and/or defibrillation occurring for the first time on the ICU.MAIN OUTCOME MEASURES: Primary endpoint: occurrence of cardiac-arrest in the ICU. Secondary endpoints: diagnostic and therapeutic measures; risk factors and marginal probabilities of no-return of spontaneous circulation; rates of return of spontaneous circulation, hospital discharge, 1-year-survival and 1-year-neurological outcome. RESULTS: A total of 114 cardiac arrests were observed out of 14 264 ICU admissions; incidence 0.8%; 95% confidence interval (CI) 0.7 to 1.0; 45.6% received at least one additional diagnostic test, such as blood gas analysis (36%), echocardiography (19.3%) or chest x-ray (9.9%) with a resulting change in therapy in 52%, (more frequently in those with a return

of spontaneous circulation vs none, P = 0.023). Risk factors for no-return of spontaneous circulation were cardiac comorbidities (OR 5.4; 95% CI, 1.4 to 20.7) and continuous renal replacement therapy (OR 5.9; 95% CI, 1.7 to 20.8). Bicarbonate levels greater than 21 mmol l-1 were associated with a higher mortality risk in combination either with cardiac comorbidities (bicarbonate <21 mmol l-1: 13%; 21 to 26 mmol l-1: 45%; >26 mmol l-1: 42%) or with a SOFA at least 2 (bicarbonate <21 mmol l-1: 8%; 21 to 26 mmol l-1: 40%; >26 mmol l-1: 37%). In-hospital mortality was 78.1% (n=89); 1-year survival-rate was 10.5% (95% CI, 5.5 to 17.7) and survival with a good neurological outcome was 6.1% (95% CI, 2.5 to 12.2). CONCLUSION: Cardiac arrest in ICU is a rare complication with a high mortality and low rate of good neurological outcome. The development of a structured approach to resuscitation should include all available resources of an ICU and adequately consider the complete diagnostic and therapeutic spectra as our results indicate that these are still underused. The development of prediction models of death should take into account cardiac and hepatic comorbidities, continuous renal replacement therapy, SOFA at least 2 before cardiac arrest and bicarbonate level. Further research should concentrate on identifying early predictors and on the prevention of cardiac arrest in ICU.

2. Resusc Plus. 2022 Feb 8;9:100211. doi: 10.1016/j.resplu.2022.100211. eCollection 2022 Mar.
Distribution and use of automated external defibrillators and their effect on return of spontaneous circulation in Danish hospitals.
Stærk M(1)(2), Lauridsen KG(3)(4)(5), Krogh K(3)(6), Løfgren B(1)(3)(7).
ABSTRACT
INTRODUCTION: Automated external defibrillators (AEDs) increase survival after out-of-hospital cardiac arrest. However, the effect of AEDs for in-hospital cardiac arrest (IHCA) remains uncertain. This study aims to describe the distribution and use of AEDs in Danish hospitals and investigate whether early rhythm analysis is associated with return of spontaneous circulation (ROSC). METHODS: All Danish public hospitals with a cardiac arrest team were included and sent a questionnaire on the in-hospital distribution of AEDs and manual defibrillators. Further, we collected data on IHCAs including rhythm analysis, device type, cardiac arrest team arrival, and ROSC from the national database on IHCA (DANARREST). RESULTS: Of 46 hospitals, 93% had AEDs and 93% had manual defibrillators. AEDs were often placed in wards or non-clinical areas, whereas manual defibrillators were often placed in areas with high-risk patients. We identified 3,204 IHCAs. AEDs were used in 13% of IHCAs. After adjustment for confounders, chance of ROSC was higher if the first rhythm analysis was performed before the arrival of the cardiac arrest team (RR: 1.28 (95% CI: 1.12-1.46)). The relative risk of ROSC was 1.09 (0.84-1.41) when analyzing with an AED before cardiac arrest team arrival and 1.19 (1.00-1.41) when using a manual defibrillator. However, there was no significant effect modification for AED vs manual defibrillator (p = 0.26). CONCLUSION: AEDs are widely distributed in Danish hospitals but less commonly used for IHCAs compared to manual defibrillators. Rhythm analysis before arrival of the cardiac arrest team was associated with ROSC without significant effect modification of device type.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Eur Heart J Case Rep. 2022 Feb 3;6(2):ytac050. doi: 10.1093/ehjcr/ytac050. eCollection 2022 Feb.
Intracoronary IgG4-related disease as an unusual cause of sudden cardiac arrest: a case series.
Paratz ED(1)(2)(3), Ross L(3)(4)(5), Zentner D(6)(7), Morgan N(8), Bouwer H(8)(9), Lynch M(8)(9), Parsons S(8)(9), La Gerche A(1)(2)(3).

ABSTRACT

BACKGROUND: IgG4-related disease (IgG4-RD) is a fibro-inflammatory condition classically causing retroperitoneal fibrosis, aortitis, thyroiditis, or pancreatitis. Diagnosis includes the presence of lymphoplasmacytic infiltrate (with >40% ratio IgG4+:IgG plasma cells) and fibrosis. Cardiac involvement may include aortic, pericardial, or coronary disease. Coronary manifestations encompass obstructive intra-luminal lesions, external encasing pseudo-tumour on imaging, or lymphoplasmacytic arteritis. CASE SUMMARY: Case 1: A fit and healthy 50-year-old man was found deceased. His only known medical condition was treated Hashimoto's thyroiditis. Post-mortem examination demonstrated an isolated severe stenosis of the left anterior descending (LAD) coronary artery without histopathological evidence of acute myocardial infarction. Coronary plaque histopathology showed florid IgG4-positive plasma cell infiltrate throughout all layers of the artery with dense fibrous tissue connective tissue stroma, all features consistent with coronary artery IgG4-RD. Case 2: A 48-year-old man collapsed at work. Computed tomography scan 1 week prior reported an ill-defined para-aortic retroperitoneal soft tissue density. No cardiac symptoms were reported in life. Post-mortem examination showed coronary arteritis and peri-arteritis with sclerosing peri-aortitis in the LAD. There was myocardial fibrosis of the anterior left ventricle and focal myocarditis of the right ventricle. DISCUSSION: IgG4-related disease presenting as sudden cardiac death without any preceding symptoms is very rare (six prior cases identified on literature review). Reported targeted successful interventions for intracoronary IgG4-RD diagnosed in life have included steroid therapy and B cell depleting therapy (i.e. rituximab). If cardiac symptoms are present in a patient with known IgG4-RD, cardiac investigations should be promptly arranged.

2. Eur J Intern Med. 2022 Feb 16:S0953-6205(22)00071-1. doi: 10.1016/j.ejim.2022.02.015. Online ahead of print.

Is malignancy cancer an adverse factor of in-hospital clinical outcome in post-cardiac arrest?

Chen J(1), Yu M(2), Zeng R(1), Wang Y(1), Liu Q(3).

NO ABSTRACT AVAILABLE

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

1. Swiss Med Wkly. 2022 Feb 18;152:w30139. doi: 10.4414/smw.2022.w30132. eCollection 2022 Feb 14.

Organ donation after circulatory death as compared with organ donation after brain death in Switzerland - an observational study.

Elmer A(1), Rohrer ML(1), Benden C(1)(2), Krügel N(1), Beyeler F(1), Immer FF(1).

ABSTRACT

AIMS OF THE STUDY: Organ donation after circulatory death (DCD) was reintroduced in Switzerland in 2011 and accounts for a third of deceased organ donors today. Controversy persists if DCD transplants are of similar quality to transplants following donation after brain death (DBD), mainly due to warm ischaemia time DCD organs are exposed to. We compared DCD with DBD in Switzerland. METHODS: Data on deceased adults who were referred to and approved for organ donation from 1 September 2011 to 31 December 2019 were retrospectively analysed (217 DCD, 840 DBD donors). We compared DCD and DBD donor/organ characteristics, transplant rates of lungs,

liver, kidneys, and pancreas, and early liver and kidney graft function in the recipient. The effect of DCD/DBD on transplant rates (organ transplanted or not) and 72-hour recipient graft function (moderate/good vs delayed graft function / organ loss) was analysed using multivariable logistic regression. Among utilised DCD donors, we analysed the effect of functional warm ischaemia time (FWIT) and donor age on 72-hour post-transplant liver and kidney graft function, also using multivariable logistic regression. RESULTS: DCD donors were more often male (64.5% vs 56.8% p = 0.039), presented with heart disease (36.4% vs 25.5%, p <0.001), were resuscitated before hospital admission (41.9% vs 30.7%, p = 0.006), and died from anoxia (41.9% vs 23.9%). Kidney function before transplantation was comparable, lung, liver and pancreas function were poorer in DCD than DBD. Eighty-one and 91% of approved DCD and DBD donors were utilised (p <0.001). Median FWIT in DCD was 29 minutes (interquartile range 25-35). DCD transplant rates ranged from 4% (pancreas) to 73% (left kidney) and were all lower compared with DBD. Seventy-two-hour liver graft function was comparable between DCD and DBD (94.2% vs 96.6% moderate/good, p = 0.199). DCD kidney transplants showed increased risk of delayed graft function or early organ loss (odds ratios 8.32 and 5.05; 95% confidence intervals CI 5.28-13.28 and 3.22-7.95; both p <0.001, for left and right kidney transplants, respectively). No negative effect of prolonged FWIT or higher donor age was detected. CONCLUSION: Despite less favourable donor/organ characteristics compared with donation after brain death, donation after circulatory death donors are increasingly referred and today provide an important source for scarce transplants in Switzerland. We identified a higher risk for delayed graft function or early organ loss for DCD kidney transplants, but not for DCD liver transplants. When carefully selected and allowed for other risk factors in organ allocation, prolonged functional warm ischaemia time or higher age in donation after circulatory death does not seem to be associated with impaired graft function early after transplantation.

FEEDBACK

No articles identified.

DRUGS

No articles identified.

TRAUMA

1. Injury. 2022 Mar;53(3):932-937. doi: 10.1016/j.injury.2021.12.029. Epub 2021 Dec 23.
Survival factors in patients of high fall - A 10-year level-I multi-trauma center study.
Wang PH(1), Huang CH(1), Chen IC(2), Huang EP(3), Lien WC(4), Huang CH(5).
ABSTRACT
OBJECTIVES: This study aims to investigate the characteristics of patients after free falls at the Level-I trauma centers. The factors associated with survival were differentiated. METHODS: This retrospective study was conducted at the National Taiwan University Hospital, the Hsin-Chu branch, and the Yun-Lin branch, all accredited as Level-I trauma centers between January 2010 and September 2020. Adult patients with falls from height of more than one story (i.e. 3.6 m) were included. Clinical data were obtained from electronic medical records. Odds ratios (OR) were computed with 95% confidence intervals (CIs) for significant parameters for survival. RESULTS: A total of 371 patients were included. Only 2 survived to discharge with poor neurologic outcomes in 101 patients with OHCA. The overall mortality rate was 98% and 11% in patients with and without

OHCA. A higher falling height with a one-meter increase (OR, 1.14, 95% CI, 1.10-1.19) was significantly related to OHCA, especially the height over 6 m (OR, 3.07, 95% CI, 1.19-7.94). A higher trauma injury severity score (TRISS) was significantly related to survival among patients without OHCA (OR, 1.07, 95% CI, 1.04-1.11), especially TRISS≧0.945 (OR, 5.21, 95% CI, 1.28-21.24). Patients without severe head/neck injury of Abbreviated Injury Scale (AIS)≧3 (OR, 0.17, 95% CI, 0.07-0.42) were positively associated with survivors among patients without OHCA. CONCLUSION: Patients with traumatic OHCA following falls had a high mortality rate of 98% and dismal outcomes, compared with non-traumatic OHCA. Falling heights, especially over 6 m was associated with OHCA. Patients without OHCA had a mortality rate of 11%. Patients with a higher TRISS, especially more than 0.945, or without severe head injury had more chances to survive in the non-OHCA group. The study provided the evidence to guide termination of high futility resuscitation for traumatic OHCA secondary to falls to conserve the clinical resources.

2. Prehosp Disaster Med. 2022 Feb;37(1):51-56. doi: 10.1017/S1049023X21001308. Epub 2021 Dec 17.

Impact of Specific Emergency Measures on Survival in Out-of-Hospital Traumatic Cardiac Arrest.

Savary D(1)(2), Morin F(1), Douillet D(1), Drouet A(3), Ageron FX(4), Charvet R(1), Carneiro B(1), Metton P(5), Fadel M(2), Descatha A(2)(6).

ABSTRACT

INTRODUCTION: The management of out-of-hospital traumatic cardiac arrest (TCA) for professional rescuers entails Advanced Life Support (ALS) with specific actions to treat the potential reversible causes of the arrest: hypovolemia, hypoxemia, tension pneumothorax (TPx), and tamponade. The aim of this study was to assess the impact of specific rescue measures on short-term outcomes in the context of resuscitating patients with a TCA. METHODS: This retrospective study concerns all TCA patients treated in two emergency medical units, which are part of the Northern French Alps Emergency Network (RENAU), from January 2004 through December 2017. Utstein variables and specific rescue measures in TCA were compiled: fluid expansion, pelvic stabilization, tourniquet application, bilateral thoracostomy, and thoracotomy procedures. The primary endpoint was survival rate at Day 30 with good neurological status (Cerebral Performance Category [CPC] score CPC 1 and CPC 2). RESULTS: In total, 287 resuscitation attempts in TCA were included and 279 specific interventions were identified: 262 fluid expansions, 41 pelvic stabilizations, five tourniquets, and 175 bilateral thoracostomies (including 44 with TPx). CONCLUSION: Among the standard resuscitation measures to treat the reversible causes of cardiac arrest, this study found that bilateral thoracostomy and tourniquet application on a limb hemorrhage improve survival in TCA. A larger sample for pelvic stabilization is needed.

VENTILATION

1. Prehosp Disaster Med. 2022 Feb;37(1):57-64. doi: 10.1017/S1049023X21001382. Epub 2022 Jan 11.

Iatrogenic Tracheal Rupture Related to Prehospital Emergency Intubation in Adults: A 15-Year Single Center Experience.

Struck MF(1), Ondruschka B(2), Beilicke A(3)(4), Krämer S(5).

ABSTRACT

OBJECTIVE: Iatrogenic tracheal rupture is an unusual and severe complication that can be caused by tracheal intubation. The frequency, management, and outcome of iatrogenic tracheal rupture due to prehospital emergency intubation in adults by emergency response physicians has not yet been sufficiently explored. METHODS: Adult patients with iatrogenic tracheal ruptures due to prehospital

emergency intubation admitted to an academic referral center over a 15-year period (2004-2018) with consideration of individual risk factors were analyzed. RESULTS: Thirteen patients (eight female) with a mean age of 67 years met the inclusion criteria and were analyzed. Of these, eight tracheal ruptures (62%) were caused during the airway management of cardiopulmonary resuscitation (CPR). Stylet use and difficult laryngoscopy requiring multiple attempts were documented in eight cases (62%) and four cases (30%), respectively. Seven patients (54%) underwent surgery, while six patients (46%) were treated conservatively. The overall 30-day mortality was 46%; five patients died due to their underlying emergencies and one patient died of tracheal rupture. Three survivors (23%) recovered with severe neurological sequelae and four (30%) were discharged in good neurological condition. Survivors had significantly smaller mean rupture sizes (2.7cm versus 6.3cm; P <.001) and less cutaneous emphysema (n = 2 versus n = 6; P = .021) than nonsurvivors. CONCLUSIONS: Iatrogenic tracheal rupture due to prehospital emergency intubation is a rare complication. Published risk factors are not consistently present and may not be applicable to identify patients at high risk, especially not in rescue situations. Treatment options depend on individual patient condition, whereas outcome largely depends on the underlying disease and rupture extension.

CERERBRAL MONITORING

1. Am J Emerg Med. 2022 Feb 5;54:257-262. doi: 10.1016/j.ajem.2022.02.003. Online ahead of print.
Association of hypoxic ischemic brain injury on early CT after out of hospital cardiac arrest with neurologic outcome.
Schick A(1), Prekker ME(2), Kempainen RR(3), Mulder M(4), Moore J(5), Evans D(3), Hall J(5), Rodin H(6), Larson J(3), Caraganis A(7).

ABSTRACT

AIM: This study aimed to describe the prevalence of hypoxic-ischemic brain injury (HIBI) on head CT (HCT) obtained within two hours of return of spontaneous circulation (ROSC) care in the Emergency Department following out-of-hospital cardiac arrest (OHCA) and evaluate the association between early HIBI and neurologic outcome. METHODS: Retrospective single center observational study of post-OHCA patients between 2009 and 2017. Two cohorts were analyzed: those who underwent non-contrast HCT within two hours of ROSC and all others who survived to ICU admission. HIBI was defined as the presence of cerebral edema and/or abnormal gray-white matter differentiation in the HCT interpretation by a neuroradiologist. The primary outcomes were the prevalence of HIBI on early HCT and the magnitude of the association between HIBI and survival with good neurologic outcome using multivariable logistic regression. RESULTS: Following OHCA, 333 of 520 patients (64%) underwent HCT within two hours of ROSC and HIBI was present in 96 of 333 patients (29%). Of the early HCT cohort, those with HIBI had a significantly lower hospital survival (2%) and favorable neurologic outcome (1%). In those without HIBI on imaging, 88 of 237 patients (37%) had a favorable outcome. After adjustment for confounding variables, HIBI on early HCT was independently associated with a decreased likelihood of good neurologic outcome (aOR 0.015, 95% CI 0.002-0.12). CONCLUSION: HIBI was present on 29% of HCTs obtained within 2 h of ROSC in the patients selected for early imaging by emergency physicians and was strongly and inversely associated with survival with a good neurologic outcome.

2. Resuscitation. 2022 Feb 18:S0300-9572(22)00049-1. doi: 10.1016/j.resuscitation.2022.02.011. Online ahead of print.
Long-term Outcomes of Post-Cardiac Arrest Patients with Severe Neurological and Functional Impairments at Hospital Discharge.
Xiao A(1), Callaway CW(2), Coppler PJ(3); University of Pittsburgh Post-Cardiac Arrest Service.

ABSTRACT

BACKGROUND: Patients resuscitated from cardiac arrest who have severe neurological or functional disability at discharge require high-intensity long-term support. However, few data describe the long-term survival and health-care utilization for these patients. METHODS: We identified a cohort of cardiac arrest survivors ≥18 years of age, treated at a single center in Western Pennsylvania from January 2010 to December 2019, with a modified Rankin scale (mRS) of 5 at hospital discharge. We recorded demographics, cardiac arrest characteristics, and neurological exam at hospital discharge. We characterized long term survival and mortality through December 31, 2020 through National Death Index query. We described survival time overall and in subgroups using Kaplan-Meier curves. We linked cases with administrative data to determine 30, 90 day, and one-year hospital readmission rate. For subjects unable to follow commands at discharge, we reviewed records from index hospitalization to the present to describe improvement in neurological status and return home. RESULTS: We screened 2,687 patients of which 975 survived to discharge. We identified 190 subjects with mRS of 5 at hospital discharge who were sent to non-hospice settings. Of these, 43 (23%) did not follow commands at discharge. One-year mortality was 38% (n=71) with a median survival time of 4.2 years (IQR 0.3-10.9). Duration of survival did not differ based on age, sex, or ability to follow commands at hospital discharge. Within the first year of discharge, 58% (n=111) of subjects had at least one hospitalization with a median length of stay of 8 days [IQR 3-19]. Of subjects who did not follow commands at hospital discharge, 5/43 (11%) followed commands and 9 (21%) were reportedly living at home on subsequent encounters. CONCLUSIONS: Of survivors treated over a decade at our institution, 20% (n= 190) were discharged from the hospital with severe functional disability. One-year mortality was 38%, and hospital readmissions were frequent. Few patients discharged unable to follow commands regained the ability over the period of observation, but many did return to living at home. These data can help inform decision maker expectations for patient trajectory and life expectancy.

ULTRASOUND AND CPR

1. Prehosp Disaster Med. 2022 Feb;37(1):39-44. doi: 10.1017/S1049023X21001357. Epub 2022 Jan 7.
Point-of-Care Ultrasound Use by EMS Providers in Out-of-Hospital Cardiac Arrest.
Kreiser MA(1), Hill B(1), Karki D(1), Wood E(1), Shelton R(1)(2), Peterson J(1)(2), Riccio J(2)(3), Zapata I(4), Khalil PA(5)(6), Gubler D(7), LaPorta AJ(8), Roosevelt GE(9), Toney AG(1)(9).
ABSTRACT
AIM: Paramedics received training in point-of-care ultrasound (POCUS) to assess for cardiac contractility during management of medical out-of-hospital cardiac arrest (OHCA). The primary outcome was the percentage of adequate POCUS video acquisition and accurate video interpretation during OHCA resuscitations. Secondary outcomes included POCUS impact on patient management and resuscitation protocol adherence. METHODS: A prospective, observational cohort study of paramedics was performed following a four-hour training session, which included a didactic lecture and hands-on POCUS instruction. The Prehospital Echocardiogram in Cardiac Arrest (PECA) protocol was developed and integrated into the resuscitation algorithm for medical non-shockable OHCA. The ultrasound (US) images were reviewed by a single POCUS expert investigator to determine the adequacy of the POCUS video acquisition and accuracy of the video interpretation. Change in patient management and resuscitation protocol adherence data, including end-tidal carbon dioxide (EtCO2) monitoring following advanced airway placement, adrenaline administration, and compression pauses under ten seconds, were queried from the prehospital electronic health record (EHR). RESULTS: Captured images were deemed adequate in 42/49 (85.7%) scans and paramedic interpretation of sonography was accurate in 43/49 (87.7%) scans. The POCUS results altered patient management in 14/49 (28.6%) cases. Paramedics adhered to EtCO2 monitoring in

36/36 (100.0%) patients with an advanced airway, adrenaline administration for 38/38 (100.0%) patients, and compression pauses under ten seconds for 36/38 (94.7%) patients. CONCLUSION: Paramedics were able to accurately obtain and interpret cardiac POCUS videos during medical OHCA while adhering to a resuscitation protocol. These findings suggest that POCUS can be effectively integrated into paramedic protocols for medical OHCA.

ORGANISATION AND TRAINING

1. Chin Med J (Engl). 2022 Feb 23. doi: 10.1097/CM9.0000000000001946. Online ahead of print.
What is an effective cardiopulmonary resuscitation training mode?
He X(1), Ma Y, Li Z, Zhang J, Zhang J, Liang J.
NO ABSTRACT AVAILABLE

2. Resusc Plus. 2022 Feb 6;9:100205. doi: 10.1016/j.resplu.2022.100205. eCollection 2022 Mar.
Out-of-hospital cardiac arrests and bystander response by socioeconomic disadvantage in communities of New South Wales, Australia.
Munot S(1), Rugel EJ(1)(2), Von Huben A(1), Marschner S(1), Redfern J(3)(4), Ware S(5), Chow CK(1)(4)(6).
ABSTRACT
BACKGROUND & AIM: Bystander response to out-of-hospital cardiac arrest (OHCA) may relate to area-level factors, including socioeconomic status (SES). We aimed to examine whether OHCA among individuals in more disadvantaged areas are less likely to receive bystander cardiopulmonary resuscitation (CPR) compared to those in more advantaged areas. METHODS: We analysed data on OHCAs in New South Wales, Australia collected prospectively through a statewide, population-based register. We excluded non-medical arrests; arrests witnessed by a paramedic; occurring in a medical centre, nursing home, police station; or airport, and among individuals with a Do-Not-Resuscitate order. Area-level SES for each arrest was defined using the Australian Bureau of Statistics' Index of Relative Socioeconomic Disadvantage and its relationship to likelihood of receiving bystander CPR was examined using hierarchical logistic regression models. RESULTS: Overall, 39% (6622/16,914) of arrests received bystander CPR (71% of bystander-witnessed). The OHCA burden in disadvantaged areas was higher (age-standardised incidence 76-87/100,000/year in more disadvantaged quintiles 1-4 versus 52 per 100,000/year in most advantaged quintile 5). Bystander CPR rates were lower (38%) in the most disadvantaged quintile and highest (42%) in the most advantaged SES quintile. In adjusted models, younger age, being bystander-witnessed, arresting in a public location, and urban location were all associated with greater likelihood of receiving bystander CPR; however, the association between area-level SES and bystander CPR rate was not significant. CONCLUSIONS: There are lower rates of bystander CPR in less advantaged areas, however after accounting for patient and location characteristics, area-level SES was not associated with bystander CPR. Concerted efforts to engage with communities to improve bystander CPR in novel ways could improve OHCA outcomes.

3. Simul Healthc. 2022 Feb 21. doi: 10.1097/SIH.0000000000000645. Online ahead of print.
Cardiopulmonary Resuscitation During Simulated Pediatric Interhospital Transport: Lessons Learned From Implementation of an Institutional Curriculum.
Noje C(1), Duval-Arnould J, Costabile PM, Henderson E, Perretta J, Sorcher JL, Shilkofski N, Hunt EA.
ABSTRACT
INTRODUCTION: Little is known about cardiopulmonary resuscitation (CPR) quality during pediatric interhospital transport; hence, our aim was to investigate its feasibility. METHODS: After

implementing an institutional education curriculum on pediatric resuscitation during ambulance transport, we conducted a 4-year prospective observational study involving simulation events. Simulated scenarios were (1) interhospital transport of a child retrieved in cardiac arrest (Sim1) and (2) unanticipated cardiac arrest of a child during transport (Sim2). Cardiopulmonary resuscitation data were collected via Zoll RSeries defibrillators. Performance was evaluated using age-appropriate American Heart Association (AHA) Guidelines. Video recordings were reviewed for qualitative thematic analysis. RESULTS: Twenty-six simulations were included: 16 Sim1 [mannequins: Laerdal SimMan 3G (n = 13); Gaumard 5-year-old HAL (n = 3)] and 10 Sim2 [Gaumard 1-year-old HAL (n = 8); Laerdal SimBaby (n = 2)]. Median (IQR) CPR duration was 18 minutes 23 seconds (14-22 minutes), chest compression rate was 112 per minute (106-118), and fraction (CCF) was 1 (0.9-1). Five hundred eight 60-second resuscitation epochs were evaluated (Sim1: 356; Sim2: 152); 73% were AHA compliant for rate and 87.8% for CCF. Twenty-four minutes (4.7%) had pauses more than 10 seconds. One hundred fifty seven Sim1 epochs (44.1%) met criteria for excellent CPR (AHA-compliant for rate, depth, and CCF). Rates of excellent CPR were higher for learner groups with increased simulation and transport experience (59.1% vs. 35.3%, $P < 0.001$). Thematic analysis identified performance-enhancing strategies, stemming from anticipating challenges, planning solutions, and ensuring team's shared mental model. CONCLUSIONS: High-quality CPR may be achievable during pediatric interhospital transport. Certain transport-specific strategies may enhance resuscitation quality. Learners' performance improved with simulation and transport experience, highlighting ongoing education's role.

4. PLoS One. 2022 Feb 25;17(2):e0264272. doi: 10.1371/journal.pone.0264272. eCollection 2022.
Incidence of preventable cardiopulmonary arrest in a mature part-time rapid response system: A prospective cohort study.
Song MJ(1), Lee DS(2), Choi YY(2), Lee DY(2), Jo HM(2), Lim SY(1), Park JS(1), Cho YJ(1), Yoon HI(1), Lee JH(1), Lee CT(1), Lee YJ(1).
ABSTRACT
BACKGROUND: The purpose of a rapid response system (RRS) is to reduce the incidence of preventable cardiopulmonary arrests (CPAs) and patient deterioration in general wards. The objective of this study is to investigate the incidence and temporal trends of preventable CPAs and determine factors associated with preventable CPAs in a hospital with a mature RRS. METHODS: This was a single-center prospective cohort study of all CPAs occurring in the general ward between March 2017 and June 2020. The RRS operates from 07:00 to 23:00 on weekdays and from 07:00 to 12:00 on Saturdays. All CPAs were reviewed upon biweekly conference, and a panel of intensivists judged their preventability. Trends of preventable CPAs were analyzed using Poisson regression models and factors associated with preventable CPAs were analyzed using multivariable logistic regression. RESULTS: There were 253 CPAs over 40 months, and 64 (25.3%) of these were preventable. The incidence rate of CPAs was 1.07 per 1000 admissions and that of preventable CPAs was 0.27 per 1000 admissions. The number of preventable CPAs decreased by 24% each year (incidence rate ratio = 0.76; p = 0.039) without a change in the total CPA incidence. The most common contributor to the preventability was delayed response from physicians (n = 41, 64.1%). A predictable CPA with a pre-alarm sign had increased odds in the occurrence of preventable CPAs, while a cardiac cause of CPAs and RRS operating hours had decreased odds in terms of occurrence of preventable CPA. CONCLUSION: Our study showed that one-fourth of all CPAs occurring in the general wards were preventable, and these arrests decreased each year. A mature RRS can evolve to reduce preventable CPAs with regular self-evaluation. Efforts should be directed at improving physicians' response time since a delay in their response was the most common cause of preventable CPAs.

5. J Clin Med. 2022 Feb 16;11(4):1033. doi: 10.3390/jcm11041033.

Direct Transport to Cardiac Arrest Center and Survival Outcomes after Out-of-Hospital Cardiac Arrest by Urbanization Level.

Jung E(1)(2), Ro YS(3)(4)(5), Park JH(3)(4)(5), Ryu HH(1)(2)(5), Shin SD(3)(4)(5).

ABSTRACT

Current guidelines for post-resuscitation care recommend regionalized care at a cardiac arrest center (CAC). Our objectives were to evaluate the effect of direct transport to a CAC on survival outcomes of out-of-hospital cardiac arrests (OHCAs), and to assess interaction effects between CAC and urbanization levels. Adult EMS-treated OHCAs with presumed cardiac etiology between 2015 and 2019 were enrolled. The main exposure was the hospital where OHCA patients were transported by EMS (CAC or non-CAC). The outcomes were good neurological recovery and survival to discharge. Multivariable logistic regression analyses were conducted. Interaction analysis between the urbanization level of the location of arrest (metropolitan or urban/rural area) and the exposure variable was performed. Among the 95,931 study population, 23,292 (24.3%) OHCA patients were transported directly to CACs. Patients in the CAC group had significantly higher likelihood of good neurological recovery and survival to discharge than the non-CAC group (both $p < 0.01$, aORs (95% CIs): 1.75 (1.63-1.89) and 1.70 (1.60-1.80), respectively). There were interaction effects between CAC and the urbanization level for good neurological recovery and survival to discharge. Direct transport to CAC was associated with significantly better clinical outcomes compared to non-CAC, and the findings were strengthened in OHCAs occurring in nonmetropolitan areas.

6. J Am Heart Assoc. 2022 Feb 23:e022238. doi: 10.1161/JAHA.121.022238. Online ahead of print.

Cost Analysis From a Randomized Comparison of Immediate Versus Delayed Angiography After Cardiac Arrest.

Camaro C(1), Bonnes JL(1), Adang EM(2), Spoormans EM(3), Janssens GN(3), van der Hoeven NW(3), Jewbali LS(4), Dubois EA(4), Meuwissen M(5), Rijpstra TA(6), Bosker HA(7), Blans MJ(8), Bleeker GB(9), Baak R(10), Vlachojannis GJ(11), Eikemans BJ(12), van der Harst P(13), van der Horst IC(14)(15), Voskuil M(16), van der Heijden JJ(17), Beishuizen B(18), Stoel M(19), van der Hoeven H(20), Henriques JP(21), Vlaar AP(22), Vink MA(23), van den Bogaard B(24), Heestermans TA(25), de Ruijter W(26), Delnoij TS(15)(27), Crijns HJ(27), Jessurun GA(28), Oemrawsingh PV(29), Gosselink MT(30), Plomp K(31), Magro M(32), Elbers PW(33), van de Ven PM(34), Lemkes JS(3), van Royen N(1)(3).

ABSTRACT

Background In patients with out-of-hospital cardiac arrest without ST-segment elevation, immediate coronary angiography did not improve clinical outcomes when compared with delayed angiography in the COACT (Coronary Angiography After Cardiac Arrest) trial. Whether 1 of the 2 strategies has benefits in terms of health care resource use and costs is currently unknown. We assess the health care resource use and costs in patients with out-of-hospital cardiac arrest. Methods and Results A total of 538 patients were randomly assigned to a strategy of either immediate or delayed coronary angiography. Detailed health care resource use and cost-prices were collected from the initial hospital episode. A generalized linear model and a gamma distribution were performed. Generic quality of life was measured with the RAND-36 and collected at 12-month follow-up. Overall total mean costs were similar between both groups (EUR 33 575±19 612 versus EUR 33 880±21 044; P=0.86). Generalized linear model: (β, 0.991; 95% CI, 0.894-1.099; P=0.86). Mean procedural costs (coronary angiography and percutaneous coronary intervention, coronary artery bypass graft) were

higher in the immediate angiography group (EUR 4384±3447 versus EUR 3028±4220; P<0.001). Costs concerning intensive care unit and ward stay did not show any significant difference. The RAND-36 questionnaire did not differ between both groups. Conclusions The mean total costs between patients with out-of-hospital cardiac arrest randomly assigned to an immediate angiography or a delayed invasive strategy were similar during the initial hospital stay. With respect to the higher invasive procedure costs in the immediate group, a strategy awaiting neurological recovery followed by coronary angiography and planned revascularization may be considered.

7. Hosp Top. 2022 Feb 21:1-8. doi: 10.1080/00185868.2022.2038749. Online ahead of print.
Emergency Room Nurses' Attitudes toward Family Presence during Resuscitation: A Cross-Sectional Study.
Alzawaidah MJ(1), Al-Amer R(2)(3), Amro AJ(4), Alkafri SF(4), Al-Hussami M(5), Alhurani A(6).
ABSTRACT
INTRODUCTION: Although there are guidelines that encourage the family presence during cardiopulmonary resuscitation, literature that reported on the healthcare team's attitudes suggested that this practice is often discouraged, and it remains a debatable topic. AIM: To assess the Emergency Room Nurses' Attitudes toward family presence during cardiopulmonary resuscitation procedures. RESEARCH DESIGN: A cross-sectional descriptive correlation research design was used for this study. PARTICIPANTS AND RESEARCH CONTEXT: A non-probability convenience sample for this study comprised 222 registered nurses who have worked in emergency departments. The study used Family Presence During Resuscitation scale to collect the data related to nurses' attitude toward family presence during CPR. ETHICAL CONSIDERATIONS: This study was approved by the ethics committee at Al-Zaytoonah University of Jordan. RESULTS: Jordanian nurses had a positive attitude toward the health beliefs with a mean score of (3.71 ± 0.81), followed by cues and triggers (3.60 ± 0.82). The least attitude endorsed by nurses was perceived self-efficacy with a mean score of (2.87 ± 0.80). Point-biserial correlation yielded a positive correlation between marital status and cues or triggers (r = 0.055; p = 0.043). Moreover, person correlation showed a positive relationship between age and health beliefs (r = 00.134; p = 0.040) and a negative correlation between experience and self-efficacy (r=-0.141; p = 0.043). CONCLUSION: Enhancing nurses' confidence based on evidence-based practice would prepare nurses to handle family presence during resuscitation.

8. Eur J Emerg Med. 2022 Apr 1;29(2):142-143. doi: 10.1097/MEJ.0000000000000836.
Frequency of survival to hospital discharge after cardiopulmonary resuscitation on FOX TV's The Resident.
Herrera-Perez D(1), Gill J(2), Haslam A(3), Crain T(4), Klossner Q(1), Prasad V(3)(5).
NO ABSTRACT AVAILABLE

POST-CARDIAC ARREST TREATMENTS

1. J Clin Med. 2022 Feb 14;11(4):996. doi: 10.3390/jcm11040996.
Proteomics-Based Serum Alterations of the Human Protein Expression after Out-of-Hospital Cardiac Arrest: Pilot Study for Prognostication of Survivors vs. Non-Survivors at Day 1 after Return of Spontaneous Circulation (ROSC).
Hinkelbein J(1), Kolaparambil Varghese Johnson L(2), Kiselev N(3), Schmitz J(1), Hellmich M(4), Drinhaus H(1), Lichtenstein T(5), Storm C(6), Adler C(7)(8).
ABSTRACT

BACKGROUND: Targeted temperature management (TTM) is considered standard therapy for patients after out-of-hospital cardiac arrest (OHCA), cardiopulmonary resuscitation (CPR), and return of spontaneous circulation (ROSC). To date, valid protein markers do not exist to prognosticate survivors and non-survivors before the end of TTM. The aim of this study is to identify specific protein patterns/arrays, which are useful for prediction in the very early phase after ROSC. MATERIAL AND METHODS: A total of 20 adult patients with ROSC (19 male, 1 female; 69.9 ± 9.5 years) were included and dichotomized in two groups (survivors and non-survivors at day 30). Serum samples were drawn at day 1 after ROSC (during TTM). Three panels (organ failure, metabolic, neurology, inflammation; OLINK, Uppsala, Sweden) were utilised. A total of four proteins were found to be differentially regulated (>2- or <-0.5-fold decrease; t-test). Bioinformatic platforms were utilised to analyse pathways and identify signalling cascades and to screen for potential biomarkers. RESULTS: A total of 276 proteins were analysed and revealed only 11 statistically significant protein alterations (Siglec-9, LAYN, SKR3, JAM-B, N2DL-2, TNF-B, BAMBI, NUCB2, STX8, PTK7, and PVLAB). Following the Bonferroni correction, no proteins were found to be regulated as statistically significant. Concerning the protein fold change for clinical significance, four proteins (IL-1 alpha, N-CDase, IL5, CRH) were found to be regulated in a clinically relevant context. CONCLUSIONS: Early analysis at 1 day after ROSC was not sufficiently possible during TTM to prognosticate survival or non-survival after OHCA. Future studies should evaluate protein expression later in the course after ROSC to identify promising protein candidates.

2. Emerg Med Int. 2022 Feb 11;2022:9818174. doi: 10.1155/2022/9818174. eCollection 2022.
New Strategies for High Quality of CPR and Post-Resuscitation Care.
Lin YR(1)(2)(3)(4), Smereka J(5)(6), Ng KC(7), Ryan JM(8).
NO ABSTRACT AVAILABLE

3. Front Cardiovasc Med. 2022 Feb 3;9:799446. doi: 10.3389/fcvm.2022.799446. eCollection 2022.
Computed-Tomography as First-line Diagnostic Procedure in Patients With Out-of-Hospital Cardiac Arrest.
Adel J(1), Akin M(1), Garcheva V(1), Vogel-Claussen J(2), Bauersachs J(1), Napp LC(1), Schäfer A(1).
ABSTRACT
BACKGROUND: Mortality after out-of-hospital cardiac arrest (OHCA) with return of spontaneous circulation (ROSC) remains high despite numerous efforts to improve outcome. For patients with suspected coronary cause of arrest, coronary angiography is crucial. However, there are other causes and potentially life-threatening injuries related to cardiopulmonary resuscitation (CPR), which can be detected by routine computed tomography (CT). MATERIALS AND METHODS: At Hannover Medical School, rapid coronary angiography and CT are performed in successfully resuscitated OHCA patients as a standard of care prior to admission to intensive care. We analyzed all patients who received CT following OHCA with ROSC over a three-year period. RESULTS: There were 225 consecutive patients with return of spontaneous circulation following out-of-hospital cardiac arrest. Mean age was 64 ± 13 years, 75% were male. Of them, 174 (77%) had witnessed arrest, 145 (64%) received bystander CPR, and 123 (55%) had a primary shockable rhythm. Mean time to ROSC was 24 ± 20 min. There were no significant differences in CT pathologies in patients with or without ST-segment elevations in the initial ECG. Critical CT findings qualifying as a potential cause for cardiac arrest were intracranial bleeding (N = 6), aortic dissection (N = 5), pulmonary embolism (N = 17), pericardial tamponade (N = 3), and tension pneumothorax (N = 11). Other pathologies were regarded as consequences of CPR and relevant for further treatment: aspiration (N = 62), rib fractures (N = 161), sternal fractures (N = 50), spinal fractures (N = 11), hepatic bleeding (N = 12), and intra-abdominal air (N = 3). CONCLUSION: Early CT fallowing OHCA uncovers a high number of causes and consequences of OHCA and CPR. Those are relevant for post-arrest care and are frequently life-threatening, suggesting that CT can contribute to improving prognosis following OHCA.

4. N Engl J Med. 2022 Feb 24;386(8):724-734. doi: 10.1056/NEJMoa2115998.
Treating Rhythmic and Periodic EEG Patterns in Comatose Survivors of Cardiac Arrest.
Ruijter BJ(1), Keijzer HM(1), Tjepkema-Cloostermans MC(1), Blans MJ(1), Beishuizen A(1), Tromp SC(1), Scholten E(1), Horn J(1), van Rootselaar AF(1), Admiraal MM(1), van den Bergh WM(1), Elting JJ(1), Foudraine NA(1), Kornips FHM(1), van Kranen-Mastenbroek VHJM(1), Rouhl RPW(1), Thomeer EC(1), Moudrous W(1), Nijhuis FAP(1), Booij SJ(1), Hoedemaekers CWE(1), Doorduin J(1), Taccone FS(1), van der Palen J(1), van Putten MJAM(1), Hofmeijer J(1); TELSTAR Investigators.
ABSTRACT
BACKGROUND: Whether the treatment of rhythmic and periodic electroencephalographic (EEG) patterns in comatose survivors of cardiac arrest improves outcomes is uncertain. METHODS: We conducted an open-label trial of suppressing rhythmic and periodic EEG patterns detected on continuous EEG monitoring in comatose survivors of cardiac arrest. Patients were randomly assigned in a 1:1 ratio to a stepwise strategy of antiseizure medications to suppress this activity for at least 48 consecutive hours plus standard care (antiseizure-treatment group) or to standard care alone (control group); standard care included targeted temperature management in both groups. The primary outcome was neurologic outcome according to the score on the Cerebral Performance Category (CPC) scale at 3 months, dichotomized as a good outcome (CPC score indicating no, mild, or moderate disability) or a poor outcome (CPC score indicating severe disability, coma, or death). Secondary outcomes were mortality, length of stay in the intensive care unit (ICU), and duration of mechanical ventilation. RESULTS: We enrolled 172 patients, with 88 assigned to the antiseizure-treatment group and 84 to the control group. Rhythmic or periodic EEG activity was detected a median of 35 hours after cardiac arrest; 98 of 157 patients (62%) with available data had myoclonus. Complete suppression of rhythmic and periodic EEG activity for 48 consecutive hours occurred in 49 of 88 patients (56%) in the antiseizure-treatment group and in 2 of 83 patients (2%) in the control group. At 3 months, 79 of 88 patients (90%) in the antiseizure-treatment group and 77 of 84 patients (92%) in the control group had a poor outcome (difference, 2 percentage points; 95% confidence interval, -7 to 11; P = 0.68). Mortality at 3 months was 80% in the antiseizure-treatment group and 82% in the control group. The mean length of stay in the ICU and mean duration of mechanical ventilation were slightly longer in the antiseizure-treatment group than in the control group. CONCLUSIONS: In comatose survivors of cardiac arrest, the incidence of a poor neurologic outcome at 3 months did not differ significantly between a strategy of suppressing rhythmic and periodic EEG activity with the use of antiseizure medication for at least 48 hours plus standard care and standard care alone.

TARGETED TEMPERATURE MANAGEMENT

1. Acta Anaesthesiol Scand. 2022 Feb 26. doi: 10.1111/aas.14053. Online ahead of print.
Electrolyte profiles with induced hypothermia: a sub study of a clinical trial evaluating the duration of hypothermia after cardiac arrest.
Kirkegaard H(1), Grejs AM(2), Gudbjerg S(3), Duez C(4), Jeppesen A(4), Hassager C(5), Laitio T(6), Storm C(7), Taccone FS(8), Skrifvars MB(9), Søreide E(10).
ABSTRACT
BACKGROUND: Electrolyte disturbances can result from targeted temperature treatment (TTM) in out-of-hospital cardiac arrest (OHCA) patients. This study explores electrolyte changes in blood and urine in OHCA patients treated with TTM. METHODS: This is a sub-study of the TTH48 trial, with the inclusion of 310 unconscious OHCA patients treated with TTM at 33°C for 24 or 48 hours. Over a three-day period, serum concentrations were obtained on sodium potassium, chloride, ionized calcium, magnesium, and phosphate, as were results from a 24-hour diuresis and urine electrolyte concentration and excretion. Changes over time were analysed with a mixed-model multivariate

analysis of variance with repeated measurements. RESULTS: On admission, mean ± SD sodium concentration was 138 ± 3.5 mmol/l, which increased slightly but significantly ($p < 0.05$) during the first 24 hours. Magnesium concentration stayed within the reference interval. Median ionised calcium concentration increased from 1.11 (IQR 1.1-1.2) mmol/l during the first 24 hours ($p < 0.05$), whereas median phosphate concentration dropped to 1.02 (IQR 0.8-1.2) mmol/l ($p < 0.05$) and stayed low. During rewarming, potassium concentrations increased, and magnesium and ionises calcium concentration decreased ($p < 0.05$). Median 24-hour diuresis results on days one and two were 2,198 and 2,048 ml respectively, and the electrolyte excretion mostly stayed low in the reference interval. CONCLUSIONS: Electrolytes mostly remained within the reference interval. A temporal change occurred in potassium, magnesium and calcium concentrations with TTM's different phases. No hypothermia effect on diuresis was detected, and urine excretion of electrolytes mostly stayed low.

2. Trials. 2022 Feb 24;23(1):177. doi: 10.1186/s13063-022-06101-6.

The "Blood pressure and oxygenation targets in post resuscitation care, a randomized clinical trial": design and statistical analysis plan.

Kjaergaard J(1)(2), Schmidt H(3), Møller JE(4)(3), Hassager C(4)(5).

ABSTRACT

BACKGROUND: Comatose patients admitted after resuscitation from cardiac arrest have a significant risk of poor outcome due to hypoxic brain injury. While numerous studies have investigated and challenged the target temperature as the efficacious part of the guideline endorsed Targeted Temperature Management (TTM) protocols, our knowledge and how the remaining parts of the TTM are optimized remain sparse. The present randomized trial investigated two aspects of the TTM protocol: target blood pressure during the ICU stay and oxygenation during mechanical ventilation. Furthermore, the efficacy of device-based post-TTM fever management is addressed. METHODS: Investigator-initiated, dual-center, randomized clinical trial in comatose OHCA patients admitted to an intensive cardiac care unit. Patients are eligible for inclusion if unconscious, older than 18 years of age, and have return of spontaneous circulation for more than 20 min. INTERVENTION: allocation 1:1:1:1 into a group defined by (a) blood pressure targets in double-blind intervention targeting a mean arterial blood pressure of 63 or 77 mmHg and (b) restrictive (9-10 kPa) or liberal (13-14 kPa) of arterial oxygen concentration during mechanical ventilation. As a subordinate intervention, device-based active fever management is discontinued after 36 h or 72. Patients will otherwise receive protocolized standard of care according to international guidelines, including targeted temperature management at 36 °C for 24 h, sedation with fentanyl and propofol, and multimodal neuro-prognostication. Primary endpoint: Discharge from hospital in poor neurological status (Cerebral Performance category 3 or 4) or death, whichever comes first. SECONDARY OUTCOMES: Time to initiation of renal replacement therapy or death, neuron-specific enolase (NSE) level at 48 h, MOCA score at day 90, Modified Ranking Scale (mRS) and CPC at 3 months, NT-pro-BNP at 90 days, eGFR and LVEF at 90 days, daily cumulated vasopressor requirement during ICU stay, and need for a combination of vasopressors and inotropic agents or mechanical circulatory support. DISCUSSION: We hypothesize that low or high target blood pressure and restrictive and liberal oxygen administration will have an impact on mortality by reducing the risk and degree of hypoxic brain injury. This will be assessment neurological outcome and biochemical and neuropsychological testing after 90 days.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. PLoS One. 2022 Feb 16;17(2):e0263894. doi: 10.1371/journal.pone.0263894. eCollection 2022.

Using QRS loop descriptors to characterize the risk of sudden cardiac death in patients with structurally normal hearts.

Wu CI(1)(2), Lin YJ(1)(2), Lee IH(3), Lo MT(4), Hsieh YC(5), Chen AY(1)(6), Wang WK(1), Chang SL(1)(2), Lo LW(1)(2), Hu YF(1)(2), Chung FP(1)(2), Tuan TC(1)(2), Chao TF(1)(2), Liao JN(1)(2), Hsieh WH(4), Chang TY(1), Lin CY(1)(2), Feng AN(7), How CK(3), Chen SA(2)(5).

ABSTRACT

The predictive value of non-invasive electrocardiographic examination findings for the risk of sudden cardiac death (SCD) in populations with structurally normal hearts remains unclear. This study aimed to investigate the characteristics of the QRS vectorcardiography of surface electrocardiography in patients with structurally normal hearts who experienced SCD. We consecutively enrolled patients who underwent vectorcardiography between March 2017 and December 2018 in a tertiary referral medical center. These patients didn't have structural heart diseases, histories of congestive heart failure, or reduced ejection fraction, and they were classified into SCD (with aborted SCD history and cerebral performance category score of 1) and control groups (with an intervention for atrioventricular node reentrant tachycardia and without SCD history). A total of 162 patients (mean age, 54.3±18.1 years; men, 75.9%), including 59 in the SCD group and 103 in the control group, underwent propensity analysis. The baseline demographic variables, underlying diseases, QRS loop descriptors (the percentage of the loop area, loop dispersion, and inter-lead QRS dispersion), and other electrocardiographic parameters were compared between the two groups. In the univariate and multivariate analyses, a smaller percentage of the loop area (odds ratio, 0.0003; 95% confidence interval, 0.00-0.02; $p<0.001$), more significant V4-5 dispersion (odds ratio, 1.04; 95% confidence interval, 1.02-1.07; $p = 0.002$), and longer QRS duration (odds ratio, 1.05; 95% confidence interval, 1.00-1.10; $p = 0.04$) were associated with SCD. In conclusion, the QRS loop descriptors of surface electrocardiography could be used as non-invasive markers to identify patients experiencing aborted SCD from a healthy population. A decreased percentage of loop area and elevated V4-5 QRS dispersion values assessed using vectorcardiography were associated with an increased risk of SCD in patients with structurally normal hearts.

PEDIATRICS AND CHILDREN

1. BMC Pregnancy Childbirth. 2022 Feb 25;22(1):159. doi: 10.1186/s12884-021-04334-y.

Effect of maternal positioning during cardiopulmonary resuscitation: a systematic review and meta-analyses.

Enomoto N(1), Yamashita T(2), Furuta M(3), Tanaka H(4), Ng ESW(5), Matsunaga S(6), Sakurai A(7); Japan Resuscitation Council Maternal task force.

ABSTRACT

BACKGROUND: Although rare, cardiac arrest during pregnancy is the leading cause of maternal death. Recently, its incidence has been increasing worldwide because more pregnant women have risk factors. The provision of early, high-quality cardiopulmonary resuscitation (CPR) plays a major role in the increased likelihood of survival; therefore, it is important for clinicians to know how to manage it. Due to the aortocaval compression caused by the gravid uterus, clinical guidelines often emphasise the importance of maternal positioning during CPR, but there has been little evidence regarding which position is most effective. METHODS: We searched the Cochrane Central Register of Controlled Trials, MEDLINE, Embase, and OpenGrey (updated on April 3, 2021). We included clinical trials and observational studies with reported outcomes related to successful resuscitations. RESULTS: We included eight studies from the 1,490 screened. The eight studies were simulation-based, crossover trials that examine the quality of chest compressions. No data were available about the survival rates of mothers or foetuses/neonates. The meta-analyses showed that resuscitation of

pregnant women in the 27°-30° left-lateral tilt position resulted in lower quality chest compressions. The difference is an 19% and 9% reduction in correct compression depth rate and correct hand position rate, respectively, compared with resuscitations in the supine position. Inexperienced clinicians find it difficult to perform chest compressions in the left-lateral tilt position. CONCLUSIONS: Given that manual left uterine displacement allows the patient to remain supine, the resuscitation of women in the supine position using manual left uterine displacement should continue to be supported. Further research is needed to fill knowledge gaps regarding the effects of maternal positioning on clinical outcomes, such as survival rates following maternal cardiac arrest.

2. Notf Rett Med. 2022 Feb 17:1-10. doi: 10.1007/s10049-022-00979-0. Online ahead of print.
[Cardiopulmonary resuscitation of pregnant patients in the rescue service]. [Article in German]
Weißleder A(1), Beinkofer D(2), Gässler H(3), Treffer D(4), Dargel S(5), Schleußner E(5).
ABSTRACT
Cardiopulmonary resuscitation of a pregnant patient is a rarity in prehospital emergency medicine and an extraordinary challenge for the emergency team. Besides modifications to emergency medical procedures due to physiological changes during pregnancy, specific reversible causes must be considered and psychosocial difficulties must be managed. This article aims to present a standard operating procedure for this special situation. In these circumstances the basics of crew resource management (CRM) are of special interest for the emergency team and are therefore mentioned in this article.

3. An Pediatr (Engl Ed). 2022 Feb 16:S2341-2879(22)00007-2. doi: 10.1016/j.anpede.2021.05.011. Online ahead of print.
Novelties in the pediatric cardiopulmonary resuscitation recommendations and lines of development in Spain.
López-Herce J(1), Manrique I(2), Calvo C(3), Rodríguez A(4), Carrillo A(3), Sebastián V(5), Del Castillo J(6); en nombre del Grupo Español de RCP Pediátrica y Neonatal.
ABSTRACT
OBJECTIVES: To analyse the 2020 international and European recommendations for Paediatric cardiopulmonary resuscitation (CPR), highlighting the most important changes and propose lines of development in Spain. METHODS: Critical analysis of the paediatric cardiopulmonary resuscitation recommendations of the European Resuscitation Council. RESULTS: The most relevant changes in the CPR recommendations for 2020 are in basic CPR the possibility of activating the emergency system after performing the five rescue ventilations with the mobile phone on loudspeaker, and in advanced CPR, bag ventilation between two rescuers if possible, the administration of epinephrine as soon as a vascular access is obtained, the increase in the respiratory rate in intubated children between 10 and 25 bpm according to their age and the importance of controlling the quality and coordination of CPR. In CPR training, the importance of training non-technical skills such as teamwork, leadership and communication and frequent training to reinforce and maintain competencies is highlighted. CONCLUSIONS: It is essential that training in Paediatric CPR in Spain follows the same recommendations and is carried out with a common methodology, adapted to the characteristics of health care and the needs of the students. The Spanish Paediatric and Neonatal Cardiopulmonary Resuscitation Group should coordinate this process, but the active participation of all paediatricians and health professionals who care for children is also essential.

4. Crit Care Explor. 2022 Feb 18;10(2):e0639. doi: 10.1097/CCE.0000000000000639. eCollection 2022 Feb.
Palliative Care Utilization Following Out-of-Hospital Cardiac Arrest in Pediatrics.

Gouda SR(1), Bohr NL(2)(3), Hoehn KS(4).

ABSTRACT

OBJECTIVES: Pediatric out-of-hospital cardiac arrest (OHCA) is associated with significant morbidity and mortality. Pediatric palliative care (PPC) services could provide an integral component of the comprehensive care necessary for these patients and their families. The main objectives of this study are to examine the utilization of PPC following OHCA and compare the differences in characteristics between children who received PPC with those who did not. DESIGN: Retrospective cohort study. SETTING: An urban, tertiary PICU. PATIENTS: Children less than 21 years old admitted from October 2009 to October 2019 with an admitting diagnosis of OHCA and minimum PICU length of stay (LOS) of 48 hours. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Of the 283 patient charts reviewed, 118 patient encounters met inclusion criteria. Of those, 34 patients (28.8%) received a PPC consultation during hospitalization. Patients who received PPC had a longer PICU LOS (14.5 vs 4.0 d), a greater number of ventilator days (12.5 vs 4.0 d), and a larger proportion of do-not-resuscitate (DNR) statuses (41% vs 19%). When comparing the disposition of survivors, a greater proportion was discharged to rehab or nursing facilities (47% vs 28%), with no difference in mortality rates (53% vs 50%). In the multivariate logistic regression model, older age, longer LOS, and code status (DNR) were all associated with higher likelihood of PPC utilization. Data were analyzed using descriptive, Mann-Whitney U, and Fisher exact statistics. CONCLUSIONS: Our study demonstrates PPC services following OHCA are underutilized given the high degree of morbidity and mortality. The impact of automatic PPC consultation in all OHCA patients who survive beyond 48 hours should be explored further. Future studies are warranted to understand the benefits and barriers of PPC integration into standard postarrest care for patients and families.

5. CJEM. 2022 Feb 21. doi: 10.1007/s43678-022-00283-3. Online ahead of print.

Traumatic cardiac arrest: unique considerations for the pediatric patient.

El Tawil C(1), LeBlanc PA(2), Beno S(2), Nemeth J(3).

NO ABSTRACT AVAILABLE

EXTRACORPOREAL LIFE SUPPORT

1. Artif Organs. 2022 Feb 23. doi: 10.1111/aor.14205. Online ahead of print.

Extracorporeal cardiopulmonary resuscitation for out-of-hospital cardiac arrest: A systematic review and meta-analysis of randomized and propensity score-matched studies.

Scquizzato T(1), Bonaccorso A(1), Consonni M(1), Scandroglio AM(1), Swol J(2), Landoni G(1)(3), Zangrillo A(1)(3).

ABSTRACT

BACKGROUND: In selected patients with refractory out-of-hospital cardiac arrest, extracorporeal cardiopulmonary resuscitation represents a promising approach when conventional cardiopulmonary resuscitation fails to achieve return of spontaneous circulation. This systematic review and meta-analysis aimed to compare extracorporeal cardiopulmonary resuscitation to conventional cardiopulmonary resuscitation. METHODS: We searched PubMed, EMBASE, and the Cochrane Central Register of Controlled Trials up to November 28, 2021, for randomized trials and observational studies reporting propensity score-matched data and comparing adults with out-of-hospital cardiac arrest treated with extracorporeal cardiopulmonary resuscitation with those treated with conventional cardiopulmonary resuscitation. The primary outcome was survival with favorable neurological outcome at the longest follow-up available. Secondary outcomes were survival at the longest follow-up available and survival at hospital discharge/30 days. RESULTS: We included six studies, two randomized and four propensity score-matched studies. Patients treated with extracorporeal cardiopulmonary resuscitation had higher rates of survival with favorable

neurological outcome (81/584 [14%] vs. 46/593 [7.8%]; OR = 2.11; 95% CI, 1.41-3.15; p < 0.001, number needed to treat 16) and of survival (131/584 [22%] vs. 102/593 [17%]; OR = 1.40; 95% CI, 1.05-1.87; p = 0.02) at the longest follow-up available compared with conventional cardiopulmonary resuscitation. Survival at hospital discharge/30 days was similar between the two groups (142/584 [24%] vs. 122/593 [21%]; OR = 1.26; 95% CI, 0.95-1.66; p = 0.10). CONCLUSIONS: Evidence from randomized trials and propensity score-matched studies suggests increased survival and favorable neurological outcome in patients with refractory out-of-hospital cardiac arrest treated with extracorporeal cardiopulmonary resuscitation. Large, multicentre randomized studies are still ongoing to confirm these findings.

2. JAMA. 2022 Feb 22;327(8):737-747. doi: 10.1001/jama.2022.1025.

Effect of Intra-arrest Transport, Extracorporeal Cardiopulmonary Resuscitation, and Immediate Invasive Assessment and Treatment on Functional Neurologic Outcome in Refractory Out-of-Hospital Cardiac Arrest: A Randomized Clinical Trial.

Belohlavek J(1), Smalcova J(1)(2), Rob D(1), Franek O(2), Smid O(1), Pokorna M(2), Horák J(1), Mrazek V(1), Kovarnik T(1), Zemanek D(1), Kral A(1), Havranek S(1), Kavalkova P(1), Kompelentova L(2), Tomková H(2), Mejstrik A(2), Valasek J(2), Peran D(2), Pekara J(2), Rulisek J(3), Balik M(3), Huptych M(4), Jarkovsky J(5), Malik J(6), Valerianova A(6), Mlejnsky F(7), Kolouch P(2), Havrankova P(8), Romportl D(9), Komarek A(10), Linhart A(1); Prague OHCA Study Group.

ABSTRACT

IMPORTANCE: Out-of-hospital cardiac arrest (OHCA) has poor outcome. Whether intra-arrest transport, extracorporeal cardiopulmonary resuscitation (ECPR), and immediate invasive assessment and treatment (invasive strategy) is beneficial in this setting remains uncertain. OBJECTIVE: To determine whether an early invasive approach in adults with refractory OHCA improves neurologically favorable survival. DESIGN, SETTING, AND PARTICIPANTS: Single-center, randomized clinical trial in Prague, Czech Republic, of adults with a witnessed OHCA of presumed cardiac origin without return of spontaneous circulation. A total of 256 participants, of a planned sample size of 285, were enrolled between March 2013 and October 2020. Patients were observed until death or day 180 (last patient follow-up ended on March 30, 2021). INTERVENTIONS: In the invasive strategy group (n = 124), mechanical compression was initiated, followed by intra-arrest transport to a cardiac center for ECPR and immediate invasive assessment and treatment. Regular advanced cardiac life support was continued on-site in the standard strategy group (n = 132). MAIN OUTCOMES AND MEASURES: The primary outcome was survival with a good neurologic outcome (defined as Cerebral Performance Category [CPC] 1-2) at 180 days after randomization. Secondary outcomes included neurologic recovery at 30 days (defined as CPC 1-2 at any time within the first 30 days) and cardiac recovery at 30 days (defined as no need for pharmacological or mechanical cardiac support for at least 24 hours). RESULTS: The trial was stopped at the recommendation of the data and safety monitoring board when prespecified criteria for futility were met. Among 256 patients (median age, 58 years; 44 [17%] women), 256 (100%) completed the trial. In the main analysis, 39 patients (31.5%) in the invasive strategy group and 29 (22.0%) in the standard strategy group survived to 180 days with good neurologic outcome (odds ratio [OR], 1.63 [95% CI, 0.93 to 2.85]; difference, 9.5% [95% CI, -1.3% to 20.1%]; P = .09). At 30 days, neurologic recovery had occurred in 38 patients (30.6%) in the invasive strategy group and in 24 (18.2%) in the standard strategy group (OR, 1.99 [95% CI, 1.11 to 3.57]; difference, 12.4% [95% CI, 1.9% to 22.7%]; P = .02), and cardiac recovery had occurred in 54 (43.5%) and 45 (34.1%) patients, respectively (OR, 1.49 [95% CI, 0.91 to 2.47]; difference, 9.4% [95% CI, -2.5% to 21%]; P = .12). Bleeding occurred more frequently in the invasive strategy vs standard strategy group (31% vs 15%, respectively). CONCLUSIONS AND RELEVANCE: Among patients with refractory out-of-hospital cardiac arrest, the bundle of early intra-arrest transport, ECPR, and invasive assessment and treatment did not significantly improve survival with neurologically favorable outcome at 180 days compared with standard resuscitation. However, the trial was possibly underpowered to detect a clinically relevant difference.

3. J Formos Med Assoc. 2022 Feb 17:S0929-6646(22)00038-9. doi: 10.1016/j.jfma.2022.01.018. Online ahead of print.

Efficacy of a temporary CentriMag ventricular assist device in acute fulminant myocarditis patients revived with extracorporeal cardiopulmonary resuscitation.

Wang YH(1), Tsai CS(1), Chen JL(2), Tsai YT(1), Lin CY(1), Yang HY(1), Hsu PS(3).

ABSTRACT

BACKGROUND: Although extracorporeal life support (ECLS) can provide emergency systemic perfusion for acute fulminant myocarditis (AFM), the mortality rate remains extremely high, especially in those undergoing extracorporeal cardiopulmonary resuscitation (ECPR). Temporary ventricular assist device (VAD) can provide a more physiological blood flow direction and better subsequent organ perfusion than ECLS. We investigated temporary VAD efficacy in ECPR-revived AFM patients. METHODS: During January 2012-May 2019, we retrospectively recruited 22 AFM patients with hemodynamic collapse and ECPR; 11 underwent ECLS only and 11 underwent additional VAD support after ECLS. Systemic perfusion was compared via laboratory biochemistry at post-ECPR days 2 (D2) and 4 (D4). Consciousness and cardiac function were assessed through the Glasgow Coma Scale (GCS) and echocardiography, respectively. All major complications and causes of mortality were recorded; 30-day survival was analyzed and risk factors were predicted. RESULTS: The VAD group had significantly better hemodynamic improvement; more inotropes being tapered at D2 and D4; better data representative of systemic perfusion, including albumin, pH, bicarbonate, and lactate levels at D4; and better 30-day survival (72.7% vs. 27.2%, p = 0.033). The causes of mortality included central failure, multiple organ failure, and bacteremia with sepsis.
The risk factors included lethal dysrhythmia before ECLS, GCS <5 at D2, and elevated cardiac enzymes at D4. CONCLUSION: For AFM patients, temporary VAD could provide better systemic perfusion and organ preservation than ECLS. VAD had better survival, including improved recovery and successful transplantation. Hence, temporary VAD should be considered if ECLS cannot revive the sustained cardiogenic shock.

4. J Crit Care. 2022 Feb 22;69:154001. doi: 10.1016/j.jcrc.2022.154001. Online ahead of print.

Hyperoxia and mortality in conventional versus extracorporeal cardiopulmonary resuscitation.

Stoll SE(1), Paul E(2), Pilcher D(3), Udy A(4), Burrell A(5).

ABSTRACT

PURPOSE: Hyperoxia has been associated with adverse outcomes in post cardiac arrest (CA) patients. Study-objective was to examine the association between hyperoxia and 30-day mortality in a mixed cohort of two different modes of Cardiopulmonary Resuscitation (CPR): Extracorporeal (ECPR) vs. Conventional (CCPR). MATERIAL AND METHODS: In this retrospective cohort study of CA patients admitted to a tertiary level CA centre in Australia (over a 6.5-year time period) mean arterial oxygen levels (PaO2) and episodes of extreme hyperoxia (maximum of mean PaO2 ≥ 300 mmHg) were analysed over the first 8 days post CA. RESULTS: One hundred and sixty-nine post CA patients were assessed (ECPR n = 79 / CCPR n = 90). Mean PaO2-levels were higher in the ECPR vs CCPR group (211 mmHg ± 58.4 vs 119 mmHg ± 18.1; p < 0.0001) as was the proportion with at least one episode of extreme hyperoxia (74.7% vs 16.7%; p < 0.001). After adjusting for confounders and the mode of CPR any episode of extreme hyperoxia was independently associated with a 2.52-fold increased risk of 30-day mortality (OR: 2.52, 95% CI: 1.06-5.98; p = 0.036). CONCLUSIONS: We found extreme hyperoxia was more common in ECPR patients in the first 8 days post CA and independently associated with higher 30-day mortality, irrespective of the CPR-mode.

5. J Cardiovasc Transl Res. 2022 Feb 22. doi: 10.1007/s12265-021-10195-9. Online ahead of print.

Predictors of Survival and Favorable Neurologic Outcome in Patients Treated with eCPR: a Systematic Review and Meta-analysis.

Bertic M(1)(2), Worme M(3)(4), Foroutan F(3), Rao V(3)(5), Ross H, Billia F(3)(4), Alba AC(3)(4).

ABSTRACT
Extracorporeal cardiopulmonary resuscitation (eCPR) can improve survival in selected patients with cardiac arrest (CA). In this meta-analysis, we evaluated factors associated with short-term survival and favorable neurologic outcome (FNO) post-eCPR. In June 2019, we systematically searched electronic databases for studies reporting on survival and predictors associated with short-term survival or FNO post-eCPR using multivariable analysis. We meta-analyzed outcomes and predictors using the inverse variance method with a random-effects model. We identified 92 studies with 13 factors amenable to meta-analysis. Pooled short-term survival and FNO were 25% and 16% respectively. Lower lactate, return of spontaneous circulation, shockable rhythm, shorter CPR duration, baseline pH, shorter low-flow time, and history of hypertension were significantly associated with short-term survival. In addition, shockable rhythm, lower lactate, and use of targeted temperature management were associated with FNO. The identified factors associated with short-term survival and FNO post-eCPR could guide prognosis prediction at the time of CA.

EXPERIMENTAL RESEARCH

1. PLoS One. 2022 Feb 17;17(2):e0264165. doi: 10.1371/journal.pone.0264165. eCollection 2022.
Omecamtiv mecarbil treatment improves post-resuscitation cardiac function and neurological outcome in a rat model.
Wu SN(1), Tsai MS(1), Huang CH(1), Chen WJ(1)(2).
ABSTRACT
BACKGROUND: Myocardial dysfunction is a major cause of poor outcomes in the post-cardiac arrest period. Omecamtiv mecarbil (OM) is a selective small molecule activator of cardiac myosin that prolongs myocardial systole and increases stroke volume without apparent effects on myocardial oxygen demand. OM administration is safe and improves cardiac function in patients with acute heart failure. Whether OM improves post-resuscitation myocardial dysfunction remains unclear. This study investigated the effect of OM treatment on post-resuscitation myocardial dysfunction and outcomes. METHODS AND RESULTS: Adult male rats were resuscitated after 9.5 min of asphyxia-induced cardiac arrest. OM and normal saline was continuously intravenously infused after return of spontaneous circulation (ROSC) at 0.25 mg/kg/h for 4 h in the experimental group and control group, respectively (n = 20 in each group). Hemodynamic parameters were measured hourly and monitored for 4 h after cardiac arrest. Recovery of neurological function was evaluated by neurological functioning scores (0-12; favorable: 11-12) for rats 72 h after cardiac arrest. OM treatment prolonged left ventricular ejection time and improved post-resuscitation cardiac output. Post-resuscitation heart rate and left ventricular systolic function (dp/dt40) were not different between groups. Kaplan-Meier analysis showed non-statistically higher 72-h survival in the OM group (72.2% [13/18] and 58.8% [10/17], p = 0.386). The OM group had a higher chance of having favorable neurological outcomes in surviving rats 72 h after cardiac arrest (84.6% [11/13] vs. 40% [4/10], p = 0.026). The percentage of damaged neurons was lower in the OM group in a histology study at 72 h after cardiac arrest (55.5±2.3% vs. 76.2±10.2%, p = 0.004). CONCLUSIONS: OM treatment improved

post-resuscitation myocardial dysfunction and neurological outcome in an animal model. These findings support further pre-clinical studies to improve outcomes in post-cardiac arrest care.

2. Z Herz Thorax Gefasschir. 2022 Feb 18:1-7. doi: 10.1007/s00398-022-00491-0. Online ahead of print.
[CARL-Controlled reperfusion of the whole body]. [Article in German]
Benk C(1), Trummer G(1), Pooth JS(1), Scherer C(1), Beyersdorf F(1).
ABSTRACT
BACKGROUND: The incidence and mortality of acute cardiovascular arrest have been consistently high for decades. OBJECTIVE: How to improve the currently unsatisfactory outcome after resuscitation regarding survival and neurological, especially cerebral, sequelae? MATERIAL AND METHODS: Development of a therapeutic approach to curtail ischemia/reperfusion injury in an animal model. Development of a device system optimized for resuscitation that can be used to implement controlled reperfusion of the whole body outside the hospital. RESULTS: Establishment of CARL treatment in the clinic and in the treatment of OHCA patients. Transfer of the CARL treatment and system in a clinical observational study. First case reports in which patients survived OHCA without brain damage even after ischemia times up to 2 h. CONCLUSION: CARL treatment is potentially suitable to treat patients suffering from cardiovascular arrest refractory to treatment even for prolonged periods.

CASE REPORTS

1. Case Rep Crit Care. 2022 Feb 15;2022:3322056. doi: 10.1155/2022/3322056. eCollection 2022.
Risen Alive: The Lazarus Phenomenon.
Gaba WH(1), El Hag SA(1), Bashir SM(1).
ABSTRACT
The Lazarus phenomenon described as delayed return of spontaneous circulation (ROSC) after cessation of CPR is rare, though underreported. We present the case of a 25-year-old woman who visited our hospital for persistent vomiting and weight loss for the last six months following bariatric surgery. On the 16th day of admission, the patient experienced cardiac arrest (code blue). The patient underwent 73 min of continuous cardiopulmonary resuscitation (CPR); however, no responses were observed, which led to an announcement of death. Fifty minutes later, the family members noticed subtle eye movements that necessitated resumption of the advanced cardiac life support protocol and resuscitation. The patient survived; however, she developed significant neurological deficits secondary to prolonged anoxic brain injury. She was discharged after a ten-week stay in the hospital but did not achieve full neurologic, cognitive, and motor recovery. Patients should be observed and monitored after the cessation of CPR before confirming death.

2. Cureus. 2022 Jan 17;14(1):e21345. doi: 10.7759/cureus.21345. eCollection 2022 Jan.
Amantadine-Induced Cardiac Arrest in a Patient With COVID-19.
Bakhati B(1), Sibi VM(2), Mekala AP(1), Ronen JA(3)(4), Mungara SS(1).
ABSTRACT
Amantadine, which is known for its antiviral activity, is presently used as therapy for Parkinson's disease. Adverse effects, such as cardiac arrhythmias, have been described in patients after ingestion of amantadine. Here, we present a patient who suffered a cardiac arrest following ingestion of a low dose of amantadine. A 71-year-old man was admitted to the emergency department for a witnessed cardiac arrest. He had developed an upper respiratory tract infection

the preceding week and was prescribed 100 mg of amantadine. Within half an hour of taking the first dose, the patient collapsed. He was found to be in asystole by emergency medical services, and advanced cardiac life support protocols were initiated, including cardiopulmonary resuscitation and intubation for airway protection. However, he sustained multiple recurrences of cardiac arrest, and despite all resuscitation efforts, the patient expired.

3. JACC Case Rep. 2022 Feb 16;4(4):211-213. doi: 10.1016/j.jaccas.2022.01.001. eCollection 2022 Feb 16.

Wide Complex Tachycardia and Cardiac Arrest During Endoscopy.

Balough EM(1), Maher TR(2), Waks JW(2), D'Avila A(2), Raber I(2).

ABSTRACT

A 59-year-old man presented for implantable cardioverter-defibrillator placement after a wide QRS complex tachycardia cardiac arrest at an outside hospital. In this case report, we discuss the differential diagnosis of this patient's tachyarrhythmia and the electrophysiological studies that established the diagnosis and guided management. (Level of Difficulty: Intermediate.).

4. JACC Case Rep. 2022 Feb 2;4(3):167-169. doi: 10.1016/j.jaccas.2021.11.012. eCollection 2022 Feb 2.

Accessory Mitral Valve Tissue and Internal Mammary Artery Stenosis: Unique Considerations After Cardiac Arrest.

Craft JA 3rd(1), Reidy MR(2), Craft JA 4th(3), Pieper SJ(4), Donnelly JE(5).

ABSTRACT

A man with recurrent syncope and remote aortic coarctation repair experienced cardiac arrest with exercise stress testing. Critical coronary stenosis was discovered. Further evaluation revealed accessory mitral valve tissue and internal mammary artery occlusion. These rare abnormalities, not previously reported together, presented challenges to treatment. (Level of Difficulty: Intermediate.).

5. Ann Emerg Med. 2022 Mar;79(3):312-320. doi: 10.1016/j.annemergmed.2021.10.001.

A Woman with Cardiac Arrest.

Lin HY(1), Lee YK(2), Tsai TY(2), Chang JR(1).

NO ABSTRACT AVAILABLE