This week's PubMed 31st July – 6th August 2022: articles of interest n = 46

CPR AND COVID-19

1. Resuscitation. 2022 Aug 3:S0300-9572(22)00631-1. doi: 10.1016/j.resuscitation.2022.07.040. Online ahead of print.

Racial/Ethnic and Gender Disparities of the Impact of the COVID-19 Pandemic in Out-of-Hospital Cardiac Arrest (OHCA) in Texas.

Chavez S(1), Huebinger R(2), Kit Chan H(2), Schulz K(2), Panczyk M(2), Villa N(2), Johnson R(2), Greenberg R(3), Vithalani V(4), Al-Araji R(5), Bobrow B(2).

ABSTRACT

INTRODUCTION: Prior research shows a greater disease burden, lower BCPR rates, and worse outcomes in Black and Hispanic patients after OHCA. Female OHCA patients have lower rates of BCPR compared to men and other survival outcomes vary. The influence of the COVID-19 pandemic on OHCA incidence and outcomes in different health disparity populations is unknown. METHODS: We used data from the Texas Cardiac Arrest Registry to Enhance Survival (CARES). We determined the association of both prehospital characteristics and survival outcomes with the pandemic period in each study group through Pearson's $\chi 2$ test or Fisher's exact tests. We created mixed multivariable logistic regression models to compare odds of cardiac arrest care and outcomes between 2019 and 2020 for the study groups. RESULTS: Black OHCA patients (aOR = 0.73; 95% CI: 0.65 - 0.82) had significantly lower odds of BCPR compared to White OHCA patients, were less likely to achieve ROSC (aOR = 0.86; 95% CI: 0.74 - 0.99) or have a good CPC score (aOR = 0.47; 95% CI: 0.29 - 0.75). Compared to White patients with OHCA, Hispanic persons were less likely to have a field TOR (aOR = 0.86; 95% CI: 0.75 - 0.99) or receive BCPR (aOR = 0.78; 95% CI: 0.69 - 0.87). Female OHCA patients had higher odds of surviving to hospital admission compared to males (aOR = 1.29; 95% CI: 1.15 - 1.44). CONCLUSION: Many OHCA outcomes worsened for Black and Hispanic patients. While some aspects of care worsened for women, their odds of survival improved compared to males.

2. Palliat Med Rep. 2022 Jun 21;3(1):107-115. doi: 10.1089/pmr.2021.0084. eCollection 2022.

Perception of Older Thai Adults in a Do-Not-Attempt Resuscitation Order during the COVID-19 Era If Infected with COVID-19.

Sri-On J(1), Wongthanasit P(2), Paksopis T(1), Liu SW(3), Rojtangkom K(4), Ruangsiri R(5).

ABSTRACT

BACKGROUND: During the coronavirus disease 2019 (COVID-19) pandemic, older adults experienced high mortality rates, and their deaths were often preceded by sudden health deterioration and acute respiratory failure. This prompted older adults and their families to make rapid goals-of-care decisions. OBJECTIVE: This study aimed at determining the prevalence of and factors associated with COVID-19-related do-not-attempt resuscitation (DNR) decisions among older adults. DESIGN: This was a cross-sectional population-based survey. SETTING: Well-looking active (mobile) community-dwelling adults aged ≥60 years and residing in the Bangkok district, Thailand, between April and May 2020, were included in this study. We excluded older adults who (1) were unable to speak Thai, (2) had severe cognitive impairment, or (3) were blind or deaf. We interviewed participants about their perceptions regarding end-of-life decisions in case they got infected with COVID-19 and experienced respiratory arrest. RESULTS: We recruited 848 participants with a mean age of 70.5 (±6.74) years. When asked about their choice, 49.8% chose a DNR status, 44.5% chose full life support, and 5.8% were undecided. The three most common reasons provided by the DNR group for their choice were old age (54.9%), acceptance of death (15.6%), and fear of pain (8.5%). CONCLUSION: Almost half of the older Thai adults chose a DNR status for scenarios in which they were infected with COVID-19

and suffered from cardiac arrest during the pandemic period. Future studies should include an in-depth examination of participants' lifestyles, family life expectancy, and religious faith to understand their end-of-life decisions.

CPR/MECHANICAL CHEST COMPRESSION

1. Resuscitation. 2022 Aug 3:S0300-9572(22)00630-X. doi: 10.1016/j.resuscitation.2022.07.039. Online ahead of print.

Head and thorax elevation during cardiopulmonary resuscitation using circulatory adjuncts is associated with improved survival.

Moore JC(1), Pepe PE(2), Scheppke KA(3), Lick C(4), Duval S(5), Holley J(6), Salverda B(7), Jacobs M(8), Nystrom P(9), Quinn R(10), Adams PJ(11), Hutchison M(12), Mason C(12), Martinez E(11), Mason S(11), Clift A(11), Antevy PM(3), Coyle C(3), Grizzard E(13), Garay S(3), Crowe RP(14), Lurie KG(1), Debaty GP(15), Labarère J(16).

ABSTRACT

BACKGROUND: Survival after out-of-hospital cardiac arrest (OHCA) remains poor. A physiologically distinct cardiopulmonary resuscitation (CPR) strategy consisting of 1) active compression-decompression CPR and/or automated CPR, 2) an impedance threshold device, and 3) automated controlled elevation of the head and thorax (ACE) has been shown to improve neurological survival significantly versus conventional (C) CPR in animal models. This resuscitation device combination, termed ACE-CPR, is now used clinically. OBJECTIVES: To assess the probability of OHCA survival to hospital discharge after ACE-CPR versus C-CPR. METHODS: As part of a prospective registry study, 227 ACE-CPR OHCA patients were enrolled 04/2019 to 07/2020 from 6 pre-hospital systems in the United States. Individual C-CPR patient data (n=5,196) were obtained from three large published OHCA randomized controlled trials from high-performing pre-hospital systems. The primary study outcome was survival to hospital discharge. Secondary endpoints included return of spontaneous circulation (ROSC) and favorable neurological survival. Propensity-score matching with a 1:4 ratio was performed to account for imbalances in baseline characteristics. RESULTS: Irrespective of initial rhythm, ACE-CPR (n=222) was associated with higher adjusted odds ratios (OR) of survival to hospital discharge relative to C-CPR (n=860), when initiated in <11 minutes (3.28, 95% confidence interval [CI], 1.55 to 6.92) and <18 minutes (1.88, 95% CI, 1.03 to 3.44) after the emergency call, respectively. Rapid use of ACE-CPR was also associated with higher probabilities of ROSC and favorable neurological survival. CONCLUSIONS: Compared with C-CPR controls, rapid initiation of ACE-CPR was associated with a higher likelihood of survival to hospital discharge after OHCA.

2. Ann Transl Med. 2022 May;10(9):515. doi: 10.21037/atm-21-4984.

The role of head-up cardiopulmonary resuscitation in sudden cardiac arrest: a systematic review and meta-analysis.

Tan YK(#)(1), Han MX(#)(2), Tan BY(3), Sia CH(1)(4), Goh CXY(1), Leow AS(5), Hausenloy DJ(1)(6)(7)(8)(9), Chan ESY(10), Ong MEH(11)(12), Ho AFW(11)(13).

ABSTRACT

BACKGROUND: Head-up cardiopulmonary resuscitation (HU-CPR) is an experimental treatment for sudden cardiac arrest (SCA), where cardiopulmonary resuscitation (CPR) is performed in a ramped position. We evaluated whether HU-CPR improved survival and surrogate outcomes as compared to standard CPR (S-CPR). METHODS: Studies reporting on HU-CPR in SCA were searched for in PubMed, Embase and Cochrane Library from inception to May 1st 2021. Outcomes included neurologically-intact survival, 24-hour-survival, intracranial pressure (ICP), cerebral perfusion pressure (CerPP) and brain blood flow (BBF). Risk of bias was assessed using the GRADE assessment tool and Newcastle

Ottawa Scale. Fixed- and random-effects models were used to estimate the pooled effects of HU-CPR at 30 degrees. RESULTS: Thirteen articles met the criteria for inclusion (11 animal-only studies, one before-and-after human-only study, one study that utilized human- and animal-cadavers). Among animal studies, the most common implementation of HU-CPR was a 30-degree upward tilt of the head and thorax (n=7), while four studies investigated controlled sequential elevation (CSE). Two animal studies reported improved cerebral performance category (CPC) scores at 24-hour. The pooled effect on 24-hour survival was not statistically significant (P=0.37). The lone human study reported doubled return of spontaneous circulation (ROSC) (17.9% versus 34.2%, P<0.0001). The pooled effect on ROSC in three porcine studies was OR =3.63 (95% CI: 0.72-18.39). Pooled effects for surrogate physiological outcomes of intracranial cranial pressure (MD -14.08, 95% CI: -23.21 to -4.95, P=0.003), CerPP (MD 14.39, 95% CI: 3.07-25.72, P=0.01) and BBF (MD 0.14, 95% CI: 0.02-0.27, P=0.03), showed statistically significant benefit. DISCUSSION: Overall, HU-CPR improved neurologically-intact survival at 24-hour, ROSC and physiological surrogate outcomes in animal models. Despite promising preclinical data, and one human observational study, clinical equipoise remains surrounding the role of HU-CPR in SCA, necessitating clarification with future randomized human trials.

3. Resuscitation. 2022 Jul 27:S0300-9572(22)00615-3. doi: 10.1016/j.resuscitation.2022.07.025. Online ahead of print.

Mechanical Chest Compression Special Devices for Special Situations - as simple as that?

Selim Scholz S(1), Thies KC(2).

ABSTRACT

The recent years have seen promising developments in the chain of survival of out-of-hospital-cardiac-arrest (OHCA); early bystander CPR, first responder systems and public access defibrillation are now increasingly recognised as ‘game changers’ in cardiac arrest treatment, having shown tangible improvements in outcomes after decades of stagnation. But not only prehospital treatment has moved forward. Extracorporeal life support (ECPR) and percutaneous coronary interventions (PCI) under CPR have emerged as viable in-hospital treatment options for specific patient groups with refractory cardiac arrest. Consequently, the desire to move patients in refractory arrest to hospital is currently-one of the main drivers to further develop and evaluate portable mechanical chest compression devices (MMCD) that enable safe and uninterrupted continuation of CPR, bridging the gap to definitive care.

REGISTRIES, REVIEWS AND EDITORIALS

1. J Intensive Care. 2022 Aug 6;10(1):39. doi: 10.1186/s40560-022-00631-6.

Post-resuscitation diastolic blood pressure is a prognostic factor for outcomes of cardiac arrest patients: a multicenter retrospective registry-based analysis.

Chi CY(1)(2), Tsai MS(3), Kuo LK(4), Hsu HH(5), Huang WC(6), Lai CH(7), Chang HC(8), Tsai CL(3), Huang CH(9).

ABSTRACT

BACKGROUND: Post-resuscitation hemodynamic level is associated with outcomes. This study was conducted to investigate if post-resuscitation diastolic blood pressure (DBP) is a favorable prognostic factor. METHODS: Using TaIwan Network of Targeted Temperature ManagEment for CARDiac Arrest (TIMECARD) registry, we recruited adult patients who received targeted temperature management in nine medical centers between January 2014 and September 2019. After excluding patients with extracorporeal circulation support, 448 patients were analyzed. The first measured, single-point blood pressure after resuscitation was used for analysis. Study endpoints were survival to discharge and discharge with favorable neurologic outcomes (CPC 1-2). Multivariate analysis, area under the

receiver operating characteristic curve (AUC), and generalized additive model (GAM) were used for analysis. RESULTS: Among the 448 patients, 182 (40.7%) patients survived, and 89 (19.9%) patients had CPC 1-2. In the multivariate analysis, DBP > 70 mmHg was an independent factor for survival (adjusted odds ratio [aOR] 2.16, 95% confidence interval [CI, 1.41-3.31]) and > 80 mmHg was an independent factor for CPC 1-2 (aOR 2.04, 95% CI [1.14-3.66]). GAM confirmed that DBP > 80 mmHg was associated with a higher likelihood of CPC 1-2. In the exploratory analysis, patients with DBP > 80 mmHg had a significantly higher prevalence of cardiogenic cardiac arrest (p = 0.015) and initial shockable rhythm (p = 0.045). CONCLUSION: We found that DBP after resuscitation can predict outcomes, as a higher DBP level correlated with cardiogenic cardiac arrest.

2. Am J Emerg Med. 2022 Jul 25;60:88-95. doi: 10.1016/j.ajem.2022.07.039. Online ahead of print.
A year ReviewED: Top emergency medicine pharmacotherapy articles of 2021.
Brown CS(1), Sarangarm P(2), Faine B(3), Rech MA(4), Flack T(5), Gilbert B(6), Howington GT(7), Laub J(8), Porter B(9), Slocum GW(10), Zepeski A(3), Zimmerman DE(11).
ABSTRACT
This article highlights the most relevant emergency medicine (EM) pharmacotherapy publications indexed in 2021. A modified Delphi approach was utilized for selected journals to identify the most impactful EM pharmacotherapy studies via the GRADE system. After review of journal table of contents GRADE 1A and 1B articles were reviewed by authors. Twenty articles, 2 guidelines, 2 position papers, and 2 meta-analysis were selected for full summary. Articles included in this review highlight acute agitation management, acute appendicitis treatment, sexually transmitted infection updates, optimizing sepsis management and treatment, updates for the ideal thrombolytic agent in acute ischemic stroke and endovascular therapy candidates, indications for tranexamic acid, calicium for out of hospital cardiac arrest, optimial inotrope for cardiogenic shock, awareness during rapid sequence intubation paralysis, comparison of propofol or dexmedetomidine for sedation, treatment of cannabis hyperemsis syndrome, and prophylactic use of diphenhydramine to reduce neuroleptic side effects. Selected articles are summarized to include design, results, limitations, conclusions and impact.

3. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue. 2022 Jun;34(6):670-672. doi: 10.3760/cma.j.cn121430-20220329-00312.
[Advances in the study of optimum chest compression point for adult cardiopulmonary resuscitation]. [Article in Chinese]
Zhong H(1), Chen B(2), Liang J(1), Huang T(1), Wang J(1), Zhou M(1).
ABSTRACT
Chest compressions are a key component of cardiopulmonary resuscitation (CPR). The determination of the optimal compression point (OCP) in adult CPR is an indispensable critical factor for high quality chest compressions (CCs). At present, the OCP for adult CPR is still controversial, which still needs further research and discussion. To provide theoretical reference for determining the OCP, this paper reviews the research progress of the OCP of adult CPR from the development process of compression point and hemodynamic mechanism, so as to improve the quality of CCs and the outcome of cardiac arrest (CA) patients.

4. Resusc Plus. 2022 Jul 28;11:100281. doi: 10.1016/j.resplu.2022.100281. eCollection 2022 Sep.
China joins the family of in-hospital cardiac arrest registries.
Penketh JA(1), Nolan JP(2).
NO ABSTRACT AVAILABLE

5. AJR Am J Roentgenol. 2022 Aug 3. doi: 10.2214/AJR.22.27932. Online ahead of print.
REBOA: Expanding Applications from Traumatic Hemorrhage to Obstetrics and Cardiopulmonary Resuscitation, From the AJR Special Series on Emergency Radiology.
Webster LA(1), Little O(2), Villalobos A(1), Nguyen J(3), Nezami N(4)(5), Lilly M(1), Dariushnia S(1), Gandhi R(6), Kokabi N(1).
ABSTRACT
Resuscitative endovascular balloon occlusion of the aorta (REBOA) has emerged over the past decade as a technique to control life-threatening hemorrhage and treat hemorrhagic shock, being increasingly used to treat noncompressible traumatic torso hemorrhage. Reports during this time also support the use of the REBOA device for an expanding range of indications including non-traumatic abdominal hemorrhage, postpartum hemorrhage, placenta accreta spectrum disorder (PAS), and cardiopulmonary resuscitation (CPR). The strongest available evidence supports REBOA as a lifesaving adjunct to definitive surgical management in trauma and as a method to help prevent hysterectomy in select patients with postpartum hemorrhage or PAS. In comparison with initial descriptions of complete REBOA inflation, techniques for partial REBOA inflation have been introduced to achieve hemodynamic stability while minimizing adverse events relating to reperfusion injuries. Fluoroscopy-free REBOA has been described in various settings, including trauma, obstetrics, and out-of-hospital cardiac arrest. As use of REBOA expands outside of the trauma setting and into non-traumatic abdominal hemorrhage, obstetrics, and CPR, it is imperative for radiologists to become familiar with this technology, its proper placement, and its potential adverse sequela.

6. Curr Cardiol Rep. 2022 Aug 3. doi: 10.1007/s11886-022-01747-9. Online ahead of print.
Psychological Distress After Sudden Cardiac Arrest and Its Impact on Recovery.
Agarwal S(1), Birk JL(2), Abukhadra SL(3), Rojas DA(3), Cornelius TM(2), Bergman M(4), Chang BP(5), Edmondson DE(2), Kronish IM(2). Irving Medical Center/New York Presbyterian Hospital, New York, USA.
ABSTRACT
PURPOSE OF REVIEW: To summarize the prevalence, correlates, and health consequences of poor mental health in the increasingly sizable population of survivors of Sudden cardiac arrest (CA) and to describe current intervention research in this area. RECENT FINDINGS: After CA many patients report high psychological distress, including depression, generalized anxiety, and posttraumatic stress. Emerging evidence suggests that distressed patients' attention may narrow such that anxious awareness of afferent cardiac signals e.g., changes in heart rate or blood pressure, becomes predominant and a cause for concerned, constant monitoring. This cardiac-specific anxiety followed by behavioral avoidance and physiological hyperreactivity may increase patients' already high risk of secondary cardiovascular disease and undermine their health-related quality of life (HRQoL). Unlike other cardiovascular diseases, no clinical practice guidelines exist for assessing or treating psychological sequelae of CA. Future research should identify modifiable psychological targets to reduce secondary cardiovascular disease risk and improve HRQoL.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2022 Aug 3:S0300-9572(22)00632-3. doi: 10.1016/j.resuscitation.2022.07.041. Online ahead of print.
Pre-arrest Prediction of Survival Following In-hospital Cardiac Arrest: A Systematic Review of Diagnostic Test Accuracy Studies.

Lauridsen KG(1), Djärv T(2), Breckwoldt J(3), Tjissen JA(4), Couper K(5), Greif R(6); Education, Implementation, Team Task Force of the International Liaison Committee on Resuscitation ILCOR.

ABSTRACT

AIM: To evaluate the test accuracy of pre-arrest clinical decision tools for in-hospital cardiac arrest survival outcomes. METHODS: We searched Medline, Embase, and Cochrane Library from inception through January 2022 for randomized and non-randomized studies. We used the Quality Assessment of Diagnostic Accuracy Studies framework to evaluate risk of bias, and Grading of Recommendations Assessment, Development and Evaluation methodology to evaluate certainty of evidence. We report sensitivity, specificity, positive predictive outcome, and negative predictive outcome for prediction of survival outcomes. PROSPERO CRD42021268005. RESULTS: We searched 2517 studies and included 23 studies using 13 different scores: 12 studies investigating 8 different scores assessing survival outcomes and 11 studies using 5 different scores to predict neurological outcomes. All were historical cohorts/ case control designs including adults only. Test accuracy for each score varied greatly. Across the 12 studies investigating 8 different scores assessing survival to hospital discharge/ 30-day survival, the negative predictive values (NPVs) for the prediction of survival varied from 55.6% to 100%. The GO-FAR score was evaluated in 7 studies with NPVs for survival with cerebral performance category (CPC) 1 ranging from 95.0% to 99.2%. Two scores assessed survival with CPC ≤2 and these were not externally validated. Across all prediction scores, certainty of evidence was rated as very low. CONCLUSIONS: We identified very low certainty evidence across 23 studies for 13 different pre-arrest prediction scores to outcome following IHCA. No score was sufficiently reliable to support its use in clinical practice. We identified no evidence for children.

2. Resuscitation. 2022 Aug 3:S0300-9572(22)00628-1. doi: 10.1016/j.resuscitation.2022.07.037. Online ahead of print.

Patient-important outcomes following in-hospital cardiac arrest: Using frailty to move beyond prediction of immediate survival.

Mercier E(1), Mowbray FI(2).

NO ABSTRACT AVAILABLE

3. Eur Heart J. 2022 Aug 4:ehac414. doi: 10.1093/eurheartj/ehac414. Online ahead of print.

Trends in survival after cardiac arrest: a Swedish nationwide study over 30 years.

Jerkeman M(1), Sultanian P(1), Lundgren P(1)(2), Nielsen N(3), Helleryd E(1), Dworeck C(1)(2), Omerovic E(1)(2), Nordberg P(4), Rosengren A(1), Hollenberg J(4), Claesson A(4), Aune S(1), Strömsöe A(5)(6), Ravn-Fischer A(1)(2), Friberg H(6), Herlitz J(7)(8), Rawshani A(1)(2)(8).

ABSTRACT

AIMS: Trends in characteristics, management, and survival in out-of-hospital cardiac arrest (OHCA) and in-hospital cardiac arrest (IHCA) were studied in the Swedish Cardiopulmonary Resuscitation Registry (SCRR). METHODS AND RESULTS: The SCRR was used to study 106 296 cases of OHCA (1990-2020) and 30 032 cases of IHCA (2004-20) in whom resuscitation was attempted. In OHCA, survival increased from 5.7% in 1990 to 10.1% in 2011 and remained unchanged thereafter. Odds ratios [ORs, 95% confidence interval (CI)] for survival in 2017-20 vs. 1990-93 were 2.17 (1.93-2.43) overall, 2.36 (2.07-2.71) for men, and 1.67 (1.34-2.10) for women. Survival increased for all aetiologies, except trauma, suffocation, and drowning. OR for cardiac aetiology in 2017-20 vs. 1990-93 was 0.45 (0.42-0.48). Bystander cardiopulmonary resuscitation increased from 30.9% to 82.2%. Shockable rhythm decreased from 39.5% in 1990 to 17.4% in 2020. Use of targeted temperature management decreased from 42.1% (2010) to 18.2% (2020). In IHCA, OR for survival in 2017-20 vs. 2004-07 was 1.18 (1.06-1.31), showing a non-linear trend with probability of survival increasing by 46.6% during 2011-20. Myocardial ischaemia or infarction as aetiology decreased during 2004-20 from 67.4% to 28.3% [OR 0.30 (0.27-0.34)]. Shockable rhythm decreased from 37.4% to 23.0% [OR 0.57 (0.51-0.64)]. Approximately 90% of survivors (IHCA and OHCA) had no or mild neurological sequelae.

CONCLUSION: Survival increased 2.2-fold in OHCA during 1990-2020 but without any improvement in the final decade, and 1.2-fold in IHCA during 2004-20, with rapid improvement the last decade. Cardiac aetiology and shockable rhythms were halved. Neurological outcome has not improved.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Am J Prev Cardiol. 2022 Jul 26;11:100369. doi: 10.1016/j.ajpc.2022.100369. eCollection 2022 Sep.
Obesity in young sudden cardiac death: Rates, clinical features, and insights into people with body mass index >50kg/m(2).
Paratz ED(1)(2)(3), Ashokkumar S(3), van Heusden A(1), Smith K(4)(5), Zentner D(6)(7), Morgan N(8), Parsons S(9)(8), Thompson T(6), James P(6), Connell V(10), Pflaumer A(10)(11)(12), Semsarian C(13), Ingles J(14), Stub D(1)(2)(4)(9), Gerche A(1)(2)(3).

ABSTRACT

OBJECTIVE: To contextualize obesity rates in young sudden cardiac death (SCD) against the age-matched national population, and identify clinical and pathologic features in WHO class II and III obesity. METHODS: A prospective state-wide out-of-hospital cardiac arrest registry included all SCDs in Victoria, Australia from 2019-2021. Body mass indices (BMIs) of patients 18-50 years were compared to age-referenced general population. Characteristics of SCD patients with WHO Class II obesity (BMI ≥30kg/m2) and non-obesity (BMI<30kg/m2) were compared. Clinical characteristics of people with BMI>50kg/m2 were assessed. RESULTS: 504 patients were included. Obesity was strongly over-represented in young SCD compared to the age-matched general population (55.0% vs 28.7%, p<0.0001). Obese SCD patients more frequently had hypertension, diabetes and obstructive sleep apnoea (p<0.0001, p=0.009 and p=0.001 respectively), ventricular fibrillation as their arrest rhythm (p=0.008) and left ventricular hypertrophy (LVH) (p<0.0001). Obese patients were less likely to have toxicology positive for illicit substances (22.0% vs 32.6%, p=0.008) or history of alcohol abuse (18.8% vs 26.9%, p=0.030). Patients with BMI>50 kg/m2 represented 8.5% of young SCD. LVH (n=26, 60.5%) was their predominant cause of death and only 10 (9.3%) patients died from coronary disease. CONCLUSION: Over half of young Australian SCD patients are obese, with all obesity classes over-represented compared to the general population. Obese patients had more cardiac risk factors. Almost two thirds of patients with BMI>50 kg/m2 died from LVH, with fewer than 10% dying from coronary disease.

2. Environ Sci Pollut Res Int. 2022 Aug 3. doi: 10.1007/s11356-022-22332-1. Online ahead of print.
Increased emergency cases for out-of-hospital cardiac arrest due to cold spells in Shenzhen, China.
Dai M(#)(1), Chen S(#)(1), Huang S(#)(2), Hu J(1), Jingesi M(1), Chen Z(1), Su Y(1), Yan W(3), Ji J(3), Fang D(2), Yin P(1), Cheng J(2), Wang P(4).

ABSTRACT

Cold spells have been associated with specific diseases. However, there is insufficient scientific evidence on the effects of cold spells on out-of-hospital cardiac arrest (OHCA). Data on OHCA cases and on meteorological factors and air pollutants were collected between 2013 and 2020. We adopted a quasi-Poisson generalized additive model with a distributed lag nonlinear model (DLNM) to estimate the effect of cold spells on daily OHCA incidence. Backward attributable risk within the DLNM framework was calculated to quantify the disease burden. We compared the effects and

OHCA burden of cold spells using nine definitions. The risks of different cold spells on OHCA increased at higher intensities and longer durations. Based on Akaike's information criterion for the quasi-Poisson regression model and the attributable risk, the optimal cold spell was defined as a period in the cold month when the daily mean temperature was below the 10th percentile of the temperature distribution in the study period for at least 2 days. The single-day effect of the optimal cold spell on OHCA occurred immediately and lasted for approximately 1 week. The maximum single-day effect was 1.052 (95% CI: 1.018-1.087) at lag0, while the maximum cumulative effect was 1.433 (95% CI:1.148-1.788) after a 14-day lag. Men were more susceptible to cold spells. Young and middle-aged people were affected by cold spells similar to the elderly. Cold spells can increase the risk of OHCA with an approximately 1-week lag effect. Health regulators should take more targeted measures to protect susceptible populations during cold weather.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

1. Australas Emerg Care. 2022 Jul 29:S2588-994X(22)00049-5. doi: 10.1016/j.auec.2022.07.005. Online ahead of print.

Effect of real-time feedback device compared to use or non-use of a checklist performance aid on post-training performance and retention of infant cardiopulmonary resuscitation: A randomized simulation-based trial.

Ghazali DA(1), Rousseau R(2), Breque C(2), Oriot D(3).

ABSTRACT

INTRODUCTION: This study aims to determine the best method for achieving optimal performance of pediatric cardiopulmonary resuscitation (CPR) during simulation-based training, whether with or without a performance aid. METHODS: In this randomized controlled study, 46 participants performed simulated CPR in pairs on a Resusci Baby QCPR™ mannequin, repeated after four weeks. All participants performed the first simulation without performance aids. For the second simulation, they were randomly assigned to one of three groups with stratification based on status: throughout CPR, Group A (n = 16) was the control group and did not use a performance aid; Group B (n = 16) used the CPR checklist; Group C (n = 14) used real-time visualization of their CPR activity on a feedback device. Overall performance was assessed using the QCPR™. RESULTS: All groups demonstrated improved performance on the second simulation ($p < 0.01$). Use of the feedback device resulted in better CPR performance than use of the CPR checklist ($p = 0.02$) or no performance aid ($p = 0.04$). Additionally, participants thought that the QCPR™ could effectively improve their technical competences. CONCLUSIONS: Performance aid based on continuous feedback is helpful in the learning process. The use of the QCPR™, a real-time feedback device, improved the quality of resuscitation during infant CPR simulation-based training.

DRUGS

1. Resuscitation. 2022 Jul 30:S0300-9572(22)00624-4. doi: 10.1016/j.resuscitation.2022.07.034. Online ahead of print.

Effect of Calcium vs. Placebo on Long-Term Outcomes in Patients with Out-of-hospital Cardiac Arrest A Randomized Clinical Trial.

Fink Vallentin M(1), Granfeldt A(2), Meilandt C(1), Ling Povlsen A(1), Sindberg B(3), Holmberg MJ(4), Nees Iversen B(5), Mærkedahl R(6), Riis Mortensen L(7), Nyboe R(8), Partridge Vandborg M(9), Tarpgaard M(6), Runge C(10), Fynbo Christiansen C(11), Dissing TH(5), Juhl Terkelsen C(12), Christensen S(2), Kirkegaard H(13), Andersen LW(14).

ABSTRACT

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

TRAUMA

No articles identified.

VENTILATION

1. Indian Heart J. 2022 Aug 1:S0019-4832(22)00109-2. doi: 10.1016/j.ihj.2022.07.007. Online ahead of print.

Manual vs. Mechanical Ventilation in patients with Advanced Airway during CPR.

Senthilnathan M(1), Ravi R(2), Suganya S(3), Kumar Sivakumar R(2).

ABSTRACT

Early chest compressions and rapid defibrillation are important components of cardiopulmonary resuscitation (CPR). American heart association (AHA) recommends two breaths to be delivered for every 30 compressions for an adult cardiac arrest victim. Patient with an advanced airway like endotracheal tube (ETT) should be given one breath every 6 seconds without interruptions in chest compression (10 breaths per minute). All of the modern mechanical ventilators have option to generate spontaneous breaths by the patient if the patient has spontaneous respiratory efforts. During CPR, the mechanical ventilator is fallaciously sensing the chest compressions as patient's spontaneous trigger and thereby it delivers higher respiratory rates. Avoiding excessive ventilation is

one of the components of high quality CPR as excessive ventilation decreases venous return thereby decreasing the cardiac output and also it affects intra-thoracic pressure thereby adversely affects intra-arterial pressure. As modern ventilators have trigger for spontaneous breaths and they will be erroneously triggered by chest compressions, it would be prudent to use volume marked resuscitation bags or manual breathing devices (manual self-inflating resuscitation bag, Bain's circuit) for delivering breaths which can be synchronised with compression phase of CPR at RR of 10.min -1 with advanced airway in place. If any patient who is on mechanical ventilation develops cardiac arrest, patient should be disconnected from the mechanical ventilator and should be ventilated manually. Manual ventilation with aforementioned breathing devices should be used in a patient without and with advanced airway devices during CPR.

CERERBRAL MONITORING

1. Resuscitation. 2022 Aug 2:S0300-9572(22)00626-8. doi: 10.1016/j.resuscitation.2022.07.035. Online ahead of print.

A pilot study of methods for prediction of poor outcome by head computed tomography after cardiac arrest.

Lang M(1), Nielsen N(2), Ullén S(3), Abul-Kasim K(4), Johnsson M(5), Helbok R(6), Leithner C(7), Cronberg T(8), Moseby-Knappe M(8).

ABSTRACT

INTRODUCTION: In Sweden, head computed tomography (CT) is commonly used for prediction of neurological outcome after cardiac arrest, as recommended by guidelines. We compare the prognostic ability and interrater variability of routine and novel CT methods for prediction of poor outcome. METHODS: Retrospective study including patients from Swedish sites within the Target Temperature Management after out-of-hospital cardiac arrest trial examined with CT. Original images were assessed by two independent radiologists blinded from clinical data with eye-balling without pre-specified criteria, and with a semi-quantitative assessment. Grey-white-matter ratios (GWR) were quantified using models with 4-20 manually placed regions of interest. Prognostic abilities and interrater variability were calculated for prediction of poor outcome (modified Rankin Scale 4-6 at six months) for early (<24h) and late (≥24h) examinations. RESULTS: 68/106 (64%) of included patients were examined <24h post-arrest. Eye-balling predicted poor outcome with 89-100% specificity and 15-78% sensitivity. GWR <24h predicted neurological outcome with unsatisfactory to satisfactory Area Under the Receiver Operating Characteristics Curve (AUROC: 0.54-0.64). GWR ≥24h yielded very good to excellent AUROC (0.80-0.93). Sensitivities increased >2-3 fold in examinations performed after 24h compared to early examinations. Combining eye-balling with GWR<1.15 predicted poor outcome without false positives with sensitivities remaining acceptable. CONCLUSION: In our cohort, qualitative and quantitative CT methods predicted poor outcome with high specificity and low to moderate sensitivity. Sensitivity increased relevantly after the first 24 hours after CA. Interrater variability poses a problem and indicates the need to standardise brain CT evaluation to increase the methodś safety.

2. Resuscitation. 2022 Jul 29:S0300-9572(22)00620-7. doi: 10.1016/j.resuscitation.2022.07.029. Online ahead of print.

Early risk stratification for progression to death by neurological criteria following out-of-hospital cardiac arrest.

Coppler PJ(1), Flickinger KL(2), Darby JM(3), Doshi A(2), Guyette FX(2), Faro J(4), Callaway CW(2), Elmer J(5).

ABSTRACT

BACKGROUND: Some patients resuscitated from out-of-hospital cardiac arrest (OHCA) progress to death by neurological criteria (DNC). We hypothesized that initial brain imaging, electroencephalography (EEG), and arrest characteristics predict progression to DNC. METHODS: We identified comatose OHCA patients from January 2010 to February 2020 treated at a single quaternary care facility in Western Pennsylvania. We abstracted demographics and arrest characteristics; Pittsburgh Cardiac Arrest Category, initial motor exam and pupillary light reflex; initial brain CT grey-to-white ratio (GWR), sulcal or basal cistern effacement; initial EEG background and suppression ratio. We used two modeling approaches: fast and frugal tree (FFT) analysis to create an interpretable clinical risk stratification tool and ridge regression for comparison. We used bootstrapping to randomly partition cases into 80% training and 20% test sets and evaluated test set sensitivity and specificity. RESULTS: We included 1,569 patients, of whom 147 (9%) had diagnosed DNC. Across bootstrap samples, >99% of FFTs included three predictors: sulcal effacement, and in cases without sulcal effacement, the combination of EEG background suppression and GWR ≤ 1.23. This tree had mean sensitivity and specificity of 87% and 81%. Ridge regression with all available predictors had mean sensitivity 91% and mean specificity 83%. Subjects falsely predicted as likely to progress to DNC generally died of rearrest or withdrawal of life sustaining therapies due to poor neurological prognosis. Two of these cases awakened from coma during the index hospitalization. CONCLUSIONS: Sulcal effacement on presenting brain CT or EEG suppression with GWR ≤ 1.23 predict progression to DNC after OHCA.

3. Resuscitation. 2022 Jul 29:S0300-9572(22)00621-9. doi: 10.1016/j.resuscitation.2022.07.030. Online ahead of print.

Neurological Pupil Index and its association with other prognostic tools after cardiac arrest: A post hoc analysis.

Peluso L(1), Oddo M(2), Minini A(3), Citerio G(4), Horn J(5), Di Berardini E(3), Rundgren M(6), Cariou A(7), Payen JF(8), Storm C(9), Stammet P(10), Sandroni C(11), Silvio Taccone F(3).

ABSTRACT

INTRODUCTION: We evaluated the concordance of the Neurological pupil Index (NPi) with other predictors of outcome after cardiac arrest (CA). METHODS: Post hoc analysis of a prospective, international, multicenter study including adult CA patients. Predictors of unfavorable outcome (UO, Cerebral Performance Category of 3-5 at 3 months) included: a) worst NPi ≤2; b) presence of discontinuous encephalography (EEG) background; c) bilateral absence of N20 waves on somatosensory evoked potentials (N20ABS); d) peak neuron-specific enolase (NSE) blood levels >60 mcg/L; e) myoclonus, which were all tested in a subset of patients who underwent complete multimodal assessment (MMM). RESULTS: A total of 269/456 (59%) patients had UO and 186 (41%) underwent MMM. The presence of myoclonus was assessed in all patients, EEG in 358 (78%), N20 in 186 (41%) and NSE measurement in 228 (50%). Patients with discontinuous EEG, N20ABS or high NSE had a higher proportion of worst NPi≤2. The accuracy for NPi to predict a discontinuous EEG, N20ABS, high NSE and the presence of myoclonus was moderate. Concordance with NPi ≤2 was high for NSE, and moderate for discontinuous EEG and N20ABS. Also, the higher the number of concordant predictors of poor outcome, the lower the observed NPi. CONCLUSIONS: In this study, NPi≤ 2 had moderate to high concordance with other unfavorable outcome prognosticators of hypoxic-ischemic brain injury. This indicates that NPi measurement could be considered as a valid tool for coma prognostication after cardiac arrest.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Can J Kidney Health Dis. 2022 Jul 27;9:20543581221113383. doi: 10.1177/20543581221113383. eCollection 2022.

Dialysis Patients' Preferences on Resuscitation: A Cross-Sectional Study Design.

Alzayer H(1)(2), Geraghty AM(3), Sebastian KK(4)(5)(6), Panesar H(4)(7), Reddan DN(1)(6).

ABSTRACT

BACKGROUND: End-stage kidney disease is associated with a 10- to 100-fold increase in cardiovascular mortality compared with age-, sex-, and race-matched population. Cardiopulmonary resuscitation (CPR) in this cohort has poor outcomes and leads to increased functional morbidity. OBJECTIVE: The aim of this study is to assess patients' preferences toward CPR and advance care planning (ACP). DESIGN: cross-sectional study design. SETTING: Two outpatient dialysis units. PATIENTS: Adults undergoing dialysis for more than 3 months were included. Exclusion criteria were severe cognitive impairment or non-English-speaking patients. MEASUREMENTS: A structured interview with the use of Willingness to Accept Life-Sustaining Treatment (WALT) tool. METHODS: Demographic data were collected, and baseline Montreal Cognitive Assessment, Patient Health Questionnaire-9, Duke Activity Status Index, Charlson comorbidity index, and WALT instruments were used. Descriptive analysis, chi-square, and t test were performed along with probability plot for testing hypotheses. RESULTS: Seventy participants were included in this analysis representing a 62.5% response rate. There was a clear association between treatment burden, anticipated clinical outcome, and the likelihood of that outcome with patient preferences. Low-burden treatment with expected return to baseline was associated with 98.5% willingness to accept treatment, whereas high-burden treatment with expected return to baseline was associated with 94.2% willingness. When the outcome was severe functional or cognitive impairment, then 45.7% and 28.5% would accept low-burden treatment, respectively. The response changed based on the likelihood of the outcome. In terms of resuscitation, more than 75% of the participants would be in favor of receiving CPR and mechanical ventilation at their current health state. Over 94% of patients stated they had never discussed ACP, whereas 59.4% expressed their wish to discuss this with their primary nephrologist. LIMITATIONS: Limited generalizability due to lack of diversity. Unclear decision stability due to changes in health status and patients' priorities. CONCLUSIONS: ACP should be incorporated in managing chronic kidney disease (CKD) to improve communication and encourage patient involvement.

2. Int Emerg Nurs. 2022 Aug 1;64:101200. doi: 10.1016/j.ienj.2022.101200. Online ahead of print.

"Like a rainy weather inside of me": Qualitative content analysis of telephone consultations concerning back pain preceding out-of-hospital cardiac arrest.

Jensen B(1), Vardinghus-Nielsen H(2), Mills EHA(3), Møller AL(4), Gnesin F(4), Zylyftari N(5), Kragholm K(6), Folke F(7), Christensen HC(8), Blomberg SN(9), Torp-Pedersen C(10), Bøggild H(2).

ABSTRACT

INTRODUCTION: Cardiac arrest patients presenting with back pain are at risk of not receiving the appropriate help when calling emergency medical services. In telephone consultations regarding patients with back pain preceding an out-of-hospital cardiac arrest, we investigated how communication between caller and call-taker influenced the call-taker's interpretation of back pain descriptions and decision-making about choice of response. METHOD: The study was conducted using 20 recorded phone calls from 17 patients who contacted the Copenhagen Emergency Medical Services (Denmark) reporting back pain up to 24 hours before an out-of-hospital cardiac arrest.

Qualitative content analysis was applied. RESULTS: Two main categories emerged: (1) reasons, including subcategories: reported conditions, descriptions of conditions, patient's interpretation of condition and patient's own remedial actions; and (2) considerations, including subcategories: assessment of the severity, call-taker's interpretation of the condition, arguments for chosen response and conditions not facilitating further communication by the call-taker. CONCLUSION: In telephone consultations regarding patients with back pain preceding an out-of-hospital cardiac arrest the communication was influenced by the communicative preconditions of the call-taker. Communication in consultations where ambulances were not dispatched was characterized by complex descriptions of symptoms not easily fitting into the health system's interpretations of conditions warranting an urgent response.

3. Resusc Plus. 2022 Jul 26;11:100279. doi: 10.1016/j.resplu.2022.100279. eCollection 2022 Sep.
Location of out-of-hospital cardiac arrests and automated external defibrillators in relation to schools in an English ambulance service region.
Benson M(1), Brown TP(2), Booth S(3), Achana F(3), Smith CM(3), Price G(4), Ward M(4), Hawkes C(3), Perkins GD(2)(3).
ABSTRACT
INTRODUCTION: This study sought to identify the availability of automated external defibrillators (AEDs) in schools in the region served by West Midlands Ambulance Service University NHS Trust (WMAS), United Kingdom, and the number of out-of-hospital cardiac arrests (OHCA) that occurred at or near to schools. A secondary aim was to explore the cost effectiveness of school-based defibrillators. METHODS: This observational study used data from the national registry for OHCA (University of Warwick) to identify cases occurring at or near schools between January 2014 and December 2016 in WMAS region (n = 11,399). A school survey (n = 2,453) was carried out in September 2017 to determine the presence of AEDs and their registration status with WMAS. Geographical Information System mapping software identified OHCAs occurring within a 300-metre radius of a school. An economic analysis calculated the cost effectiveness of school-based AEDs. RESULTS: A total of 39 (0.34%) of all OHCAs occurred in schools, although 4,250 (37.3%) of OHCAs in the region were estimated to have occurred within 300 metres of a school. Of 323 school survey responses, 184 (57%) had an AED present, of which 24 (13.0%) were available 24 h/day. Economic modelling of a school-based AED programme showed additional quality-adjusted life years (QALY) of 0.26 over the lifetime of cardiac arrest survivors compared with no AED programme. The incremental cost-effectiveness ratio (ICER) was £8,916 per QALY gained. CONCLUSION: Cardiac arrests in schools are rare. Registering AEDs with local Emergency Medical Services and improving their accessibility within their local community would increase their utility.

4. Front Cardiovasc Med. 2022 Jul 15;9:840114. doi: 10.3389/fcvm.2022.840114. eCollection 2022.
Assessment of Human Factors After Advanced Life Support Courses Comparing Simulated Team and Real Team Assessment: A Randomized Controlled Cohort Trial.
Nabecker S(1)(2)(3)(4), Huwendiek S(5), Seidl C(6), Hana A(7), Theiler L(8), Greif R(1)(3)(9).
ABSTRACT
AIM: Human factors are essential for high-quality resuscitation team collaboration and are, therefore, taught in international advanced life support courses, but their assessment differs widely. In Europe, the summative life support course assessment tests mainly adhere to guidelines but few human factors. This randomized controlled simulation trial investigated instructors' and course participants' perceptions of human factors assessment after two different summative assessments. METHODS: All 5th/6th-year medical students who attended 19 advanced life support courses according to the 2015 European Resuscitation Council guidelines during one study year were invited

to participate. Each course was randomized to either: (1) Simulated team assessment (one instructor simulates a team, and the assessed person leads this "team" through a cardiac-arrest scenario test); (2) Real team assessment (4 students form a team, one of them is assessed as the team leader; team members are not assessed and act only on team leader's commands). After the summative assessments, instructors, and students rated the tests' ability to assess human factors using a visual analog scale (VAS, 0 = no agreement, 10 = total agreement). RESULTS: A total of 227 students participated in the 1-day Immediate Life Support courses, 196 students in the 2-day Advanced Life Support courses, additionally 54 instructors were included. Instructors judged all human factors significantly better in real team assessments; students rated leadership and situational awareness comparable between both assessments. Assessment pass rates were comparable between groups. CONCLUSION: Summative assessment in real teams was perceived significantly better to assess human factors. These results might influence current summative assessment practices in advanced life support courses.

5. BMC Emerg Med. 2022 Aug 2;22(1):139. doi: 10.1186/s12873-022-00690-w.
Acceptability of telephone-cardiopulmonary resuscitation (T-CPR) practice in a resource-limited country- a cross-sectional study.
Ahmed F(1), Khan UR(2), Soomar SM(2), Raheem A(2), Naeem R(2), Naveed A(3), Razzak JA(2)(4), Khan NU(2).
ABSTRACT
BACKGROUND: T-CPR has been shown to increase bystander CPR rates dramatically and is associated with improved patient survival. OBJECTIVE: To evaluate the acceptability of T-CPR by the bystanders and identify baseline quality measures of T-CPR in Karachi, Pakistan. METHODS: A cross-sectional study was conducted from January to December 2018 at the Aman foundation command and control center. Data was collected from audiotaped phone calls of patients who required assistance from the Aman ambulance and on whom the EMS telecommunicator recognized the need for CPR and provided instructions. Information was recorded using a structured questionnaire on demographics, the status of the patient, and different time variables involved in CPR performance. A One-way ANOVA was used to compare different time variables with recommended AHA guidelines. P-value ≤ 0.05 was considered significant. RESULTS: There were 481 audiotaped calls in which CPR instruction was given, listened to, and recorded data. Out of which in 459(95.4%) of cases CPR was attempted Majority of the patients were males (n = 278; 57.8%) and most had witnessed cardiac arrest (n = 470; 97.7%) at home (n = 430; 89.3%). The mean time to recognize the need for CPR by an EMS telecommunicator was 4:59 ± 1:59(min), while the mean time to start CPR instruction by a bystander was 5:28 ± 2:24(min). The mean time to start chest compression was 6:04 ± 1:52(min.). CONCLUSION: Our results show the high acceptability of T-CPR by bystanders. We also found considerable delays in recognizing cardiac arrest and initiation of CPR by telecommunicators. Further training of telecommunicators could reduce these delays.

6. Clin Exp Hypertens. 2022 Aug 3:1-7. doi: 10.1080/10641963.2022.2103145. Online ahead of print.
Knowledge, attitude and preparedness of healthcare students toward basic life support at King Khalid University, Abha, Kingdom of Saudi Arabia.
Shaik Alavudeen S(1), Basharat V(2), Khaled Bahamdan A(3), Easwaran V(1), Khaled Bahamdan G(4), Akhtar MS(1), Alshahrani S(1), Alqahtani A(5), Venkatesan K(6).
ABSTRACT
BACKGROUND: Worldwide, millions of people die of sudden cardiac arrest every year. A well-timed cardiopulmonary resuscitation (CPR) increases the possibility of survival by two- to fourfolds. This study aimed to assess the knowledge, attitude, and preparedness of health care students toward

basic life support (BLS) at King Khalid University. METHODS: A cross-sectional study was conducted among the health care students of King Khalid University from August to October 2020. Data were collected using a pretested, semi-structured questionnaire and the data were analyzed using Statistical Package for the Social Sciences. RESULRS: The total number of participants was 346. Overall, the participant's knowledge regarding the BLS was inadequate. Majority of the participants were not aware of the acronyms used in BLS. The level of education has a significant impact on the knowledge, whereas gender has no significant impact on the knowledge. The answers to the attitude and the preparedness items were also not satisfying. Lack of knowledge is one of the common reasons for not performing BLS. Periodical training program and refresher courses were the most recommended methods to increase the knowledge toward the BLS. CONCLUSION: It is evident from the current study that there is a lack of knowledge and preparedness toward BLS among most health care students. It is recommended to incorporate more BLS training and refresher courses in the health care college curricula.

7. CJEM. 2022 Aug;24(5):529-534. doi: 10.1007/s43678-022-00313-0. Epub 2022 May 19.
The impact of clinical result acquisition and interpretation on task performance during a simulated pediatric cardiac arrest: a multicentre observational study.
Rizkalla C(1), Garcia-Jorda D(2), Cheng A(3), Duff JP(4), Gottesman R(5), Weiss MJ(6), Koot DA(7), Gilfoyle E(8).
ABSTRACT
PURPOSE: The acquisition and interpretation of clinical results during resuscitations is common; however, this can delay critical clinical tasks, resulting in increased morbidity and mortality. This study aims to determine the impact of clinical result acquisition and interpretation by the team leader on critical task completion during simulated pediatric cardiac arrest before and after team training. METHODS: This is a secondary data analysis of video-recorded simulated resuscitation scenarios conducted during Teams4Kids (T4K) study (June 2011-January 2015); scenarios included cardiac arrest before and after team training. The scenario included either a scripted paper or a phone call delivery of results concurrently with a clinical transition to pulseless ventricular tachycardia. Descriptive statistics and non-parametric tests were used to compare team performance before and after training. RESULTS: Performance from 40 teams was analyzed. Although the time taken to initiate CPR and defibrillation varied depending on the type of interruption and whether the scenario was before or after team training, these findings were not significantly associated with the leader's behaviour [Kruskal-Wallis test ($p > 0.05$)]. An exact McNemar's test determined no statistically significant difference in the proportion of leaders involved or not in interpreting results between and after the training (exact p value = 0.096). CONCLUSIONS: Team training was successful in reducing time to perform key clinical tasks. Although team training modified the way leaders behaved toward the results, this behaviour change did not impact the time taken to start CPR or defibrillate. Further understanding the elements that influence time to critical clinical tasks provides guidance in designing future simulated educational activities, subsequently improving clinical team performance and patient outcomes.

POST-CARDIAC ARREST TREATMENTS

1. Resuscitation. 2022 Aug 3:S0300-9572(22)00623-2. doi: 10.1016/j.resuscitation.2022.07.032. Online ahead of print.
Post-Cardiac Arrest PCI is Underutilized Among Cancer Patients: Machine Learning Augmented Nationally Representative Case-Control Study of 30 Million Hospitalizations.

Wan Kim J(1), Monlezun D(2), Kun Park J(3), Chauhan S(3), Balanescu D(2), Koutroumpakis E(2), Palaskas N(2), Kim P(2), Hassan S(2), Botz G(4), Crommett J(4), Reddy D(4), Cilingiroglu M(2), Marmagkiolis K(5), Iliescu C(2).

ABSTRACT

BACKGROUND: Cancer patients are less likely to undergo percutaneous coronary intervention (PCI) after cardiac arrest, although they demonstrate improved mortality benefit from the procedure. We produced the largest nationally representative analysis of mortality of cardiac arrest and PCI for patients with cancer versus non-cancer. METHODS: Propensity score adjusted multivariable regression for mortality was performed in this case-control study of the United States' largest all-payer hospitalized dataset, the 2016 National Inpatient Sample. Regression models of mortality and PCI weighted by the complex survey design were fully adjusted for age, race, income, cancer metastases, NIS-calculated mortality risk by Diagnosis Related Group (DRG), acute coronary syndrome, and likelihood of undergoing PCI RESULTS: Of the 30,195,722 hospitalized adult patients, 15.43% had cancer, and 0.79% of the whole sample presented with cardiac arrest (of whom 20.57% underwent PCI). In fully adjusted regression analysis among patients with cardiac arrest, PCI significantly reduced mortality (OR 0.15, 95%CI 0.13-0.19; p<0.001) among patients with cancer greater than those without it (OR 0.21, 95%CI 0.20-0.23; p<0.001). CONCLUSIONS: This nationally representative study suggests that post-cardiac arrest PCI is underutilized among patients with cancer despite its significant mortality reduction for such patients (independent of clinical acuity).

2. CJEM. 2022 Aug;24(5):480-481. doi: 10.1007/s43678-022-00351-8. Epub 2022 Jul 22.

Does immediate coronary angiography improve survival following out-of-hospital cardiac arrest?

Kareemi H(1), Eagles D(2), Rosenberg H(2).

NO ABSTRACT AVAILABLE

TARGETED TEMPERATURE MANAGEMENT

1. Ther Hypothermia Temp Manag. 2022 Aug 1. doi: 10.1089/ther.2022.0007. Online ahead of print.

Target Temperature Management Versus Normal Temperature Management for Cardiac Arrest After Traumatic Brain Injury Patient: A Meta-Analysis and Systemic Review.

Yang Z(1), Song Z(1), Hou M(2).

ABSTRACT

This study compares the treatment outcomes between target temperature management (TTM) and normal temperature management (NTM) for cardiac arrest after traumatic brain injury (TBI). Two reviewers searched PubMed/MEDLINE, China National Infrastructure database for studies reporting on the use of TTM and NTM. All publications from inception to October 2021 were considered. Randomized control trials (RCTs) with cardiac arrest after TBI diagnoses were made based on the 2019 American Stroke Association (ASA) guidelines,1 wherein the included cardiac arrest patients underwent TTM or NTM treatment were included in this study. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses recommended tool was used for assessing the risk of bias of the included RCTs. In all, 1920 publications were identified. However, after applying the inclusion and exclusion criteria, 6 RCTs, including 1617 patients who received TTMs (n = 826) and NTMs (n = 791), were considered eligible. The meta-analysis indicated that compared with NTM, TTM did not show a decrease in the mortality, however, for those mild patients in the early stage, TTM still can decrease the mortality and better the prognosis. Compared with NTM, TTM is an effective measure to treat mild and severe patients in the early stage and improve the prognosis.

2. Crit Care. 2022 Jul 31;26(1):231. doi: 10.1186/s13054-022-04107-9.

Influence of temperature management at 33 °C versus normothermia on survival in patients with vasopressor support after out-of-hospital cardiac arrest: a post hoc analysis of the TTM-2 trial.
Düring J(1), Annborn M(2), Cariou A(3), Chew MS(4), Dankiewicz J(5), Friberg H(6), Haenggi M(7), Haxhija Z(6), Jakobsen JC(8)(9), Langeland H(10)(11), Taccone FS(12), Thomas M(13), Ullén S(14), Wise MP(15), Nielsen N(2).

ABSTRACT

BACKGROUND: Targeted temperature management at 33 °C (TTM33) has been employed in effort to mitigate brain injury in unconscious survivors of out-of-hospital cardiac arrest (OHCA). Current guidelines recommend prevention of fever, not excluding TTM33. The main objective of this study was to investigate if TTM33 is associated with mortality in patients with vasopressor support on admission after OHCA. METHODS: We performed a post hoc analysis of patients included in the TTM-2 trial, an international, multicenter trial, investigating outcomes in unconscious adult OHCA patients randomized to TTM33 versus normothermia. Patients were grouped according to level of circulatory support on admission: (1) no-vasopressor support, mean arterial blood pressure (MAP) ≥ 70 mmHg; (2) moderate-vasopressor support MAP < 70 mmHg or any dose of dopamine/dobutamine or noradrenaline/ adrenaline dose ≤ 0.25 µg/kg/min; and (3) high-vasopressor support, noradrenaline/ adrenaline dose > 0.25 µg/kg/min. Hazard ratios with TTM33 were calculated for all-cause 180-day mortality in these groups. RESULTS: The TTM-2 trial enrolled 1900 patients. Data on primary outcome were available for 1850 patients, with 662, 896, and 292 patients in the, no-, moderate-, or high-vasopressor support groups, respectively. Hazard ratio for 180-day mortality was 1.04 [98.3% CI 0.78-1.39] in the no-, 1.22 [98.3% CI 0.97-1.53] in the moderate-, and 0.97 [98.3% CI 0.68-1.38] in the high-vasopressor support groups with regard to TTM33. Results were consistent in an imputed, adjusted sensitivity analysis. CONCLUSIONS: In this exploratory analysis, temperature control at 33 °C after OHCA, compared to normothermia, was not associated with higher incidence of death in patients stratified according to vasopressor support on admission. Trial registration Clinical trials identifier NCT02908308 , registered September 20, 2016.

3. Neurocrit Care. 2022 Aug;37(Suppl 2):237-247. doi: 10.1007/s12028-022-01464-9. Epub 2022 Mar 1.

Precision Care in Cardiac Arrest: ICECAP (PRECICECAP) Study Protocol and Informatics Approach.
Elmer J(1), He Z(2)(3), May T(4), Osborn E(2), Moberg R(5), Kemp S(2), Stover J(5), Moyer E(5), Geocadin RG(6), Hirsch KG(2); PRECICECAP Study Team.

ABSTRACT

BACKGROUND: Most trials in critical care have been neutral, in part because between-patient heterogeneity means not all patients respond identically to the same treatment. The Precision Care in Cardiac Arrest: Influence of Cooling duration on Efficacy in Cardiac Arrest Patients (PRECICECAP) study will apply machine learning to high-resolution, multimodality data collected from patients resuscitated from out-of-hospital cardiac arrest. We aim to discover novel biomarker signatures to predict the optimal duration of therapeutic hypothermia and 90-day functional outcomes. In parallel, we are developing a freely available software platform for standardized curation of intensive care unit-acquired data for machine learning applications. METHODS: The Influence of Cooling duration on Efficacy in Cardiac Arrest Patients (ICECAP) study is a response-adaptive, dose-finding trial testing different durations of therapeutic hypothermia. Twelve ICECAP sites will collect data for PRECICECAP from multiple modalities routinely used after out-of-hospital cardiac arrest, including ICECAP case report forms, detailed medication data, cardiopulmonary and electroencephalographic waveforms, and digital imaging and communications in medicine files (DICOMs). We partnered with Moberg Analytics to develop a freely available software platform to allow high-resolution critical care data to be used efficiently and effectively. We will use an

autoencoder neural network to create low-dimensional representations of all raw waveforms and derivative features, censored at rewarming to ensure clinical usability to guide optimal duration of hypothermia. We will also consider simple features that are historically considered to be important. Finally, we will create a supervised deep learning neural network algorithm to directly predict 90-day functional outcome from large sets of novel features. RESULTS: PRECICECAP is currently enrolling and will be completed in late 2025. CONCLUSIONS: Cardiac arrest is a heterogeneous disease that causes substantial morbidity and mortality. PRECICECAP will advance the overarching goal of titrating personalized neurocritical care on the basis of robust measures of individual need and treatment responsiveness. The software platform we develop will be broadly applicable to hospital-based research after acute illness or injury.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

No articles identified.

PEDIATRICS AND CHILDREN

1. Pediatrics. 2022 Aug 1;150(2):e2021055462. doi: 10.1542/peds.2021-055462.
Implementation of a Pediatric Emergency Department Cardiopulmonary Resuscitation Quality Bundle.
Runkle AP(1), Gray J(1), Cabrera-Thurman MK(1), Frey M(1), Hoehn EF(2), Kerrey BT(1), Vukovic AA(1).
ABSTRACT
BACKGROUND AND OBJECTIVES: We have previously demonstrated that standardized handoff from prehospital to hospital clinicians can improve cardiopulmonary resuscitation performance for out-of-hospital cardiac arrest (OHCA) patients in a pediatric emergency department (ED). We leveraged our previous quality improvement initiative to standardize performance of a bundle of 5 discrete aspects of resuscitation for OHCA patients: intravenous or intraosseous catheter (IV/IO) access, epinephrine administration, advanced airway placement, end-tidal capnography (ETCO2) application, and cardiac rhythm verbalization. We aimed to reduce time to completion of the bundle from 302 seconds at baseline to less than 120 seconds within 1 year. METHODS: A multidisciplinary team performed video-based review of actual OHCA resuscitations in our pediatric ED. We designed interventions aimed at key drivers of bundle performance. Interventions included specific roles and responsibilities and a standardized choreography for each bundle element. To assess the effect of the interventions, time to performance of each bundle element was measured by standardized review of video recordings from our resuscitation bay. Balancing measures were time off the chest and time to defibrillator pad placement. RESULTS: We analyzed 56 cases of OHCA from May 2019 through May 2021. Time to bundle completion improved from a baseline of 302 seconds to 147 seconds. Four of 5 individual bundle elements also demonstrated significant improvement. These improvements were sustained without any negative impact on balancing measures. CONCLUSIONS: Standardized choreography for the initial minutes of ED cardiac arrest resuscitation shows promise to decrease time to crucial interventions in children presenting to the pediatric ED with OHCA.

2. Cureus. 2022 Jul 1;14(7):e26505. doi: 10.7759/cureus.26505. eCollection 2022 Jul.
Pediatric Cardiac Arrest Outcomes in the United States: A Nationwide Database Cohort Study.
Mir T(1), Shafi OM(2)(3), Uddin M(1), Nadiger M(4)(5), Sibghat Tul Llah F(6), Qureshi WT(7).
ABSTRACT

Background Knowledge about the causes and outcomes of pediatric cardiac arrest in the emergency department is limited. The aim of our study was to evaluate the characteristics and outcomes of pediatric cardiac arrest in the emergency department (EDCA) and inpatient (IPCA) settings in the United States using a large database designed to provide nationwide estimates. Methods We performed a retrospective cohort study using the Nationwide Emergency Department Sample (NEDS), a database that includes both ED and inpatient encounters. The NEDS was analyzed for episodes of cardiac arrest between 2016-2018 in patients aged ≤18 years. Patients with cardiac arrest were identified using the International Classification of Diseases, 10th revision codes. Results A total of 15,348 pediatric cardiac arrest events with cardiopulmonary resuscitation were recorded, of which 13,239 had EDCA and 2,109 had IPCA. A lower survival rate of 19% was observed for EDCA compared to 40.4% for IPCA. While more than half of the EDCA events had no associated diagnoses, trauma (15.6%), respiratory failure (5%), asphyxiation (2.7%), acidosis (2.4%), and ventricular arrhythmia (1.4%) were associated with the remaining events. In comparison, the most frequently associated diagnoses for IPCA were respiratory failure (75.8%), acidosis (43.9%), acute kidney injury (27.2%), trauma (27.1%), and sepsis (22.5%). Conclusions Survival rates for EDCA were less than half of that for IPCA. The low survival rates along with the distinctive characteristics of EDCA events suggest the need for further research in this area to identify remediable factors and improve survival.

3. Med Educ Online. 2022 Dec;27(1):2106811. doi: 10.1080/10872981.2022.2106811.
Pediatic code blue event anaylsis: Performance of non-acute health-care providers.
Chamberlain G(1), Gupta R(2)(3), Lobos AT(4).

ABSTRACT

In-hospital pediatric cardiopulmonary arrest is rare. With more than 50% of patients not surviving to discharge following cardiopulmonary arrest, it is important that health-care providers (HCPs) respond appropriately to deteriorating patients. Our study evaluated the performance of basic life support skills using non-acute HCPs during pediatric inpatient resuscitation events. We conducted a retrospective chart review of all code blue team (CBT) activations in non-acute care areas of a tertiary care children's hospital from 2008 to 2017. The main outcomes were frequency of life support algorithmic assessments and interventions (critical actions) performed by non-acute HCPs prior to the arrival of CBT. CBT activation and outcome data were summarized descriptively. Logistic regression was used to assess for an association of outcomes with the presence of established leadership. A total of 60 CBT activations were retrieved, 48 of which had data available on isolated non-acute HCP performance. Most children (93%) survived to discharge. Critical action performance review revealed that an airway, breathing and pulse assessment was documented to have occurred in 33%, 69% and 29% of cases, respectively. A full primary assessment was documented in 6% of cases. The presence of established leadership was associated with the performance of a partial ABC assessment. Our results suggest that resuscitation performance of pediatric inpatient non-acute HCPs often does not adhere to standard life support guidelines. These results highlight the need to reconsider the current approaches used for non-acute HCP resuscitation training.

EXTRACORPOREAL LIFE SUPPORT

1. Crit Care Explor. 2022 Jul 25;4(7):e0733. doi: 10.1097/CCE.0000000000000733. eCollection 2022 Jul.
The Association of Modifiable Postresuscitation Management and Annual Case Volume With Survival After Extracorporeal Cardiopulmonary Resuscitation.

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ABSTRACT

It is not know if hospital-level extracorporeal cardiopulmonary resuscitation (ECPR) case volume, or postcannulation clinical management associate with survival outcomes. OBJECTIVES: To describe variation in postresuscitation management practices, and annual hospital-level case volume, for patients who receive ECPR and to determine associations between these management practices and hospital survival. DESIGN: Observational cohort study using case-mix adjusted survival analysis. SETTING AND PARTICIPANTS: Adult patients greater than or equal to 18 years old who received ECPR from the Extracorporeal Life Support Organization Registry from 2008 to 2019. MAIN OUTCOMES AND MEASURES: Generalized estimating equation logistic regression was used to determine factors associated with hospital survival, accounting for clustering by center. Factors analyzed included specific clinical management interventions after starting extracorporeal membrane oxygenation (ECMO) including coronary angiography, mechanical unloading of the left ventricle on ECMO (with additional placement of a peripheral ventricular assist device, intra-aortic balloon pump, or surgical vent), placement of an arterial perfusion catheter distal to the arterial return cannula (to mitigate leg ischemia); potentially modifiable on-ECMO hemodynamics (arterial pulsatility, mean arterial pressure, ECMO flow); plus hospital-level annual case volume for adult ECPR. RESULTS: Case-mix adjusted patient-level management practices varied widely across individual hospitals. We analyzed 7,488 adults (29% survival); median age 55 (interquartile range, 44-64), 68% of whom were male. Adjusted hospital survival on ECMO was associated with mechanical unloading of the left ventricle (odds ratio [OR], 1.3; 95% CI, 1.08-1.55; p = 0.005), performance of coronary angiography (OR, 1.34; 95% CI, 1.11- 1.61; p = 0.002), and placement of an arterial perfusion catheter distal to the return cannula (OR, 1.39; 95% CI, 1.05-1.84; p = 0.022). Survival varied by 44% across hospitals after case-mix adjustment and was higher at centers that perform more than 12 ECPR cases/yr (OR, 1.23; 95% CI, 1.04-1.45; p = 0.015) versus medium- and low-volume centers. CONCLUSIONS AND RELEVANCE: Modifiable ECMO management strategies and annual case volume vary across hospitals, appear to be associated with survival and should be the focus of future research to test if these hypothesis-generating associations are causal in nature.

2. ASAIO J. 2022 Aug 1;68(8):987-995. doi: 10.1097/MAT.0000000000001613. Epub 2021 Dec 1.

Survival and Factors Associated with Survival with Extracorporeal Life Support During Cardiac Arrest: A Systematic Review and Meta-Analysis.

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ABSTRACT

The survival rate after cardiac arrest (CA) remains low. The utilization of extracorporeal life support is proposed to improve management. However, this resource-intensive tool is associated with complications and must be used in selected patients. We performed a meta-analysis to determine predictive factors of survival. Among the 81 studies included, involving 9256 patients, survival was 26.2% at discharge and 20.4% with a good neurologic outcome. Meta-regressions identified an association between survival at discharge and lower lactate values, intrahospital CA, and lower cardio pulmonary resuscitation (CPR) duration. After adjustment for age, intrahospital CA, and mean CPR duration, an initial shockable rhythm was the only remaining factor associated with survival to discharge (β = 0.02, 95% CI: 0.007-0.02; p = 0.0004).

3. Catheter Cardiovasc Interv. 2022 Aug;100(2):274-278. doi: 10.1002/ccd.30295. Epub 2022 Jun 10.

Percutaneous mechanical thrombectomy and extracorporeal membranous oxygenation: A case series.

Mously H(1), Hajjari J(1), Chami T(2), Hammad T(1), Schilz R(3), Carman T(1), Elgudin Y(1)(4), Abu-Omar Y(1)(4), Pelletier MP(1)(4), Shishehbor MH(1), Li J(1).

ABSTRACT
BACKGROUND: Massive or high-risk pulmonary embolism (PE) is a potentially life-threatening diagnosis with significant morbidity and mortality if treatment is delayed. Extracorporeal membrane oxygenation (ECMO) and large bore thrombectomy (LBT) in isolation have been used to stabilize and treat patients with massive PE, however, literature describing the combination of both modalities is lacking. We present a case series involving 9 patients who underwent combined ECMO and LBT and their outcomes. METHODS: This was a retrospective chart review of patients with confirmed PE, who underwent LBT and ECMO. We retrospectively captured clinical, therapeutic, and outcome data at the time of pulmonary embolism response team (PERT) activation and during the follow-up period for up to 90 days. RESULTS: Nine patients who had PERT activation with confirmed PE diagnosis have undergone combined LBT and ECMO initiation since the advent of our PERT program. The median age was 57 (range 28-68) years. Six patients out of 9 (55%) had cardiac arrest before therapy. All patients exhibited right heart strain on computed tomography and echocardiogram. The median ECMO duration was 5 days (range 2.3-11.6 days), with mean hospitalization of 16.1 days (range 1.5-30.9). Mortality was 22% at 90-day follow-up period. CONCLUSION: Patients with massive pulmonary embolism who suffer cardiac arrest have significant morbidity and mortality. ECMO in combination with LBT is a viable treatment option for patients with significant hemodynamic compromise.

EXPERIMENTAL RESEARCH

1. Transplant Proc. 2022 Aug 2:S0041-1345(22)00409-2. doi: 10.1016/j.transproceed.2022.05.033. Online ahead of print.

Inhibition of Γδ T Cells Alleviates Brain Ischemic Injury in Cardiopulmonary-Cerebral Resuscitation Mice.

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ABSTRACT
BACKGROUND: A half-million people in the United States suffer from cardiac arrest (CA) requiring cardiopulmonary resuscitation (CPR). An inflammatory mechanism is associated with neuronal injury in the presence of cerebral ischemia. T lymphocytes are identified as crucial regulators of inflammation. Therefore, we investigated the relationship between CA/CPR-induced ischemia injury and T lymphocytes. METHODS: C57BL/6 mice were subjected to CA through injection of KCl (30 μL of 0.5 mol/L) and cessation of mechanical ventilation followed by CPR. The survival rate and neurologic deficit scores were assessed. Terminal deoxynucleotidyl transferase dUTP nick end labeling staining was carried out to detect neuronal death. Histologic changes were observed by hematoxylin-eosin staining. The levels of Trgv4, Trgv5 and Trgv7 were quantified by RT-qPCR. Inflammatory responses were identified by measurement of IL-1β, IL-6 and IL-17. RESULTS: Downregulated γδ T cells improved survival and neurologic outcomes and inhibits neuronal apoptosis. γδ T inhibition protected brains from CA/CPR-mediated tissue damage. UC7-13D5 treatment inhibited the levels of γδ T markers. Knockdown of γδ T cells ameliorated neuroinflammation. CONCLUSIONS: Inhibition of

γδ T cells ameliorates ischemic injury in mice with CA/CPR by attenuating inflammation and neuronal apoptosis.

2. Exp Neurol. 2022 Aug 3:114197. doi: 10.1016/j.expneurol.2022.114197. Online ahead of print.
Chrysophanol postconditioning attenuated cerebral ischemia-reperfusion injury induced NLRP3-related pyroptosis in a TRAF6-dependent manner.
Xia P(1), Marjan M(2), Liu Z(1), Zhou W(3), Zhang Q(3), Cheng C(3), Zhao M(3), Tao Y(3), Wang Z(4), Ye Z(5).
ABSTRACT
Individuals who suffer from post-CA (cardiac arrest) brain injury experience higher mortality and more severe functional disability. Neuroinflammation has been identified as a vital factor in cerebral ischemia-reperfusion injury (CIRI) following CA. Pyroptosis induces neuronal death by triggering an excessive inflammatory injury. Chrysophanol possesses robust anti-inflammatory features, and it is protective against CIRI. The purpose of this research was to assess the effect of Chrysophanol postconditioning on CIRI-induced pyroptotic cell death, and to explore its underlying mechanisms. CIRI was induced in rats by CA and subsequent cardiopulmonary resuscitation, and PC12 cells were exposed to oxygen-glucose deprivation/reoxygenation (OGD/R) to imitate CIRI in vitro. It was found that post-CA brain injury led to a notable cerebral damage revealed by histopathological changes and neurological outcomes. The existence of pyroptosis was also confirmed in in vivo and in vitro CIRI models. Moreover, we further confirmed that Chrysophanol, the main bioactive ingredient of Rhubarb, significantly suppressed expressions of pyroptosis-associated proteins, e.g., NLRP3, ASC, cleaved-caspase-1 and N-terminal GSDMD, and inhibited the expression of tumor necrosis factor receptor-associated factor 6 (TRAF6). Furthermore, NLRP3 overexpression neutralized the neuroprotection of Chrysophanol postconditioning, suggesting that pyroptosis was the major neuronal death pathway modulated by Chrysophanol postconditioning in OGD/R. Additionally, the neuroprotection of Chrysophanol postconditioning was also abolished by gain-of-function analyses of TRAF6. Finally, the results demonstrated that Chrysophanol postconditioning suppressed the interaction between TRAF6 and NLRP3. Taken together, our findings revealed that Chrysophanol postconditioning was protective against CIRI by inhibiting NLRP3-related pyroptosis in a TRAF6-dependent manner.

3. J Vis Exp. 2022 Jul 12;(185). doi: 10.3791/63888.
Transthoracic Echocardiography to Assess Post-Resuscitation Left Ventricular Dysfunction After Acute Myocardial Infarction and Cardiac Arrest in Pigs.
De Giorgio D(1), Olivari D(1), Fumagalli F(1), Staszewsky L(2), Ristagno G(3).
ABSTRACT
One of the main causes of out-of-hospital cardiac arrest is acute myocardial infarction (AMI). After successful resuscitation from cardiac arrest, approximately 70% of patients die before hospital discharge due to post-resuscitation myocardial and cerebral dysfunction. In experimental models, myocardial dysfunction after cardiac arrest, characterized by an impairment in both left ventricular (LV) systolic and diastolic function, has been described as reversible but very little data are available in cardiac arrest models associated with AMI in pigs. Transthoracic echocardiography is the first-line diagnostic test for the assessment of myocardial dysfunction, structural changes and/or AMI extension. In this pig model of ischemic cardiac arrest, echocardiography was done at baseline and 2-4 and 96 hours after resuscitation. In the acute phase, the examinations are done in anesthetized, mechanically ventilated pigs (weight 39.8 ± 0.6 kg) and ECG is recorded continuously. Mono- and bi-dimensional, Doppler and tissue Doppler recordings are acquired. Aortic and left atrium diameter, end-systolic and end-diastolic left ventricular wall thicknesses, end-diastolic and end-systolic

diameters and shortening fraction (SF) are measured. Apical 2-, 3-, 4-, and 5-chamber views are acquired, LV volumes and ejection fraction are calculated. Segmental wall motion analysis is done to detect the localization and estimate the extent of myocardial infarction. Pulsed Wave Doppler echocardiography is used to record trans-mitral flow velocities from a 4-apical chamber view and trans-aortic flow from a 5-chamber view to calculate LV cardiac output (CO) and stroke volume (SV). Tissue Doppler Imaging (TDI) of LV lateral and septal mitral anulus is recorded (TDI septal and lateral s', e', a' velocities). All the recordings and measurements are done according to the recommendations of the American and European Societies of Echocardiography Guidelines.

4. Transl Stroke Res. 2022 Aug 3. doi: 10.1007/s12975-022-01047-y. Online ahead of print.
Neuroprotection of NSC Therapy is Superior to Glibenclamide in Cardiac Arrest-Induced Brain Injury via Neuroinflammation Regulation.
Wang Z(1), Zhang S(1), Du J(1), Lachance BB(2), Chen S(1), Polster BM(3), Jia X(4)(5)(6)(7)(8).
ABSTRACT
Cardiac arrest (CA) is common and devastating, and neuroprotective therapies for brain injury after CA remain limited. Neuroinflammation has been a target for two promising but under-developed post-CA therapies: neural stem cell (NSC) engrafting and glibenclamide (GBC). It is critical to understand whether one therapy has superior efficacy over the other and to further understand their immunomodulatory mechanisms. In this study, we aimed to evaluate and compare the therapeutic effects of NSC and GBC therapies post-CA. In in vitro studies, BV2 cells underwent oxygen-glucose deprivation (OGD) for three hours and were then treated with GBC or co-cultured with human NSCs (hNSCs). Microglial polarization phenotype and TLR4/NLRP3 inflammatory pathway proteins were detected by immunofluorescence staining. Twenty-four Wistar rats were randomly assigned to three groups (control, GBC, and hNSCs, N = 8/group). After 8 min of asphyxial CA, GBC was injected intraperitoneally or hNSCs were administered intranasally in the treatment groups. Neurological-deficit scores (NDSs) were assessed at 24, 48, and 72 h after return of spontaneous circulation (ROSC). Immunofluorescence was used to track hNSCs and quantitatively evaluate microglial activation subtype and polarization. The expression of TLR4/NLRP3 pathway-related proteins was quantified via Western blot. The in vitro studies showed the highest proportion of activated BV2 cells with an increased expression of TLR4/NLRP3 signaling proteins were found in the OGD group compared to OGD + GBC and OGD + hNSCs groups. NDS showed significant improvement after CA in hNSC and GBC groups compared to controls, and hNSC treatment was superior to GBC treatment. The hNSC group had more inactive morphology and anti-inflammatory phenotype of microglia. The quantified expression of TLR4/NLRP3 pathway-related proteins was significantly suppressed by both treatments, and the suppression was more significant in the hNSC group compared to the GBC group. hNSC and GBC therapy regulate microglial activation and the neuroinflammatory response in the brain after CA through TLR4/NLRP3 signaling and exert multiple neuroprotective effects, including improved neurological function and shortened time of severe neurological deficit. In addition, hNSCs displayed superior inflammatory regulation over GBC.

CASE REPORTS

1. J Cardiol Cases. 2021 Sep 28;25(4):199-203. doi: 10.1016/j.jccase.2021.09.006. eCollection 2022 Apr.
A case of ventricular fibrillation without left ventricular systolic dysfunction induced by trastuzumab emtansine for breast cancer.
Takeda M(1), Takada T(1), Shiba N(1).
ABSTRACT

Trastuzumab-induced cardiomyopathy is a known complication of its use in breast cancer treatment. However, cardiac complications of trastuzumab without left ventricular systolic dysfunction have been rarely reported. These include left bundle branch block, sinus node dysfunction, and ventricular tachycardia. We herein report a case of a 47-year-old female with human epidermal growth factor receptor 2-positive, stage IV breast cancer without a history of cardiovascular disease. During treatment with trastuzumab emtansine (T-DM1), she presented with out-of-hospital cardiac arrest and was resuscitated by automated cardioverter defibrillator (AED). Emergent cardiac catheterization revealed no organic obstruction and coronary vasospasm in her coronary arteries, and no left ventricular systolic dysfunction. Ventricular fibrillation (VF) was documented by an event memory of AED. T-DM1 was withdrawn and implantable cardioverter defibrillator was implanted. Thereafter, VF or life-threatening arrhythmia were not documented for 36 months until her death by breast cancer. We concluded that the etiology of her VF event was T-DM1-induced cardiotoxicity. We believe this is the first report of life-threatening VF event without cardiomyopathy induced by T-DM1. <Learning objective: Trastuzumab emtansine (T-DM1) therapy for breast cancer has been associated with an increased risk of left ventricular dysfunction. However, non-myopathic cardiac complications of T-DM1 are rare. To our knowledge, this is the first report that describes a ventricular fibrillation without left ventricular dysfunction after taking T-DM1. We strongly suggest that not only monitoring of left ventricular systolic function, but heart-rhythm monitoring should be performed in patients taking T-DM1.>.

2. Anesth Pain Med (Seoul). 2022 Jul;17(3):298-303. doi: 10.17085/apm.21116. Epub 2022 Jun 17.
Unexpected pulmonary edema and cardiac arrest following wedge resection of spontaneous pneumothorax -A case report.
Han W(1), Kim GS(1), Lee JM(1), Lim CM(1), Yang HS(1), Jeong CY(1), Park DH(1).
ABSTRACT
BACKGROUND: Reexpansion pulmonary edema is a rare but potentially lethal complication. We report a case of suspected reexpansion pulmonary edema that led to cardiac arrest. CASE: A 16-year-old male patient underwent wedge resection due to right pneumothorax. The patient showed pink frothy sputum three hours following surgery, and a chest x-ray showed right unilateral pulmonary edema. Thirteen hours following surgery, the patient continuously showed pink frothy sputum and presented with severe hypoxemia, tachypnea, and tachycardia. After transferring to the intensive care unit (ICU), he developed ventricular tachycardia. Cardiopulmonary resuscitation was performed for 32 min. Chest X-ray showed diffuse bilateral pulmonary edema. Extracorporeal membrane oxygenation was performed. During the 65 days of ICU care, the patient became mentally alert. However, follow-up echocardiography revealed severe heart failure. CONCLUSIONS: Rexpansion pulmonary edema can rapidly progress to diffuse bilateral pulmonary edema. Therefore, careful observation is required for the patients who show signs of pulmonary edema after reexpansion.