This week's PubMed 5th June – 11th June 2022: articles of interest n = 50

CPR AND COVID-19

1. JMIR Nurs. 2022 May 7. doi: 10.2196/38044. Online ahead of print.
Developing and Testing a Protocol for Managing Cardiopulmonary Resuscitation of Patients with Suspected or Confirmed COVID-19: An In-Situ Simulation Study.
Sowan A(1), Heins J(2), Dayton C(3), Scherer E(4), Tam WS(5), Saikumar H(6).
ABSTRACT
BACKGROUND: Resuscitating patients with suspected or confirmed COVID-19 imposes unique challenges to organizations and code blue teams. Studies that applied the American Heart Association (AHA) COVID-19-related Interim Resuscitation Guideline and similar European guidelines are scarce. OBJECTIVE: This study aimed to develop and test a cardiopulmonary resuscitation (CPR) protocol based on the AHA COVID-19-related Interim Resuscitation Guideline. METHODS: The study was conducted as an in-situ simulation in a medical intensive care unit. The COVID-19 CPR protocol was created and validated by 11 healthcare team members and was tested using four simulation sessions where 46 code blue team members participated. During the simulation, we observed role clarity, effectiveness of the communication, team dynamics, infection control measures, and availability of essential supplies and equipment. RESULTS: The main issues identified in each simulation session were debriefed to the code blue teams and were used to further revise the protocol. These include assignment of tasks, availability of equipment and supplies, and failure of communication between the in-room and out-of-room teams. Solutions included changes in placement of team members and roles and responsibilities; creation of isolation code medication package, a respiratory therapy kit, and isolation code blue bag; and utilization of two-way radios and N-95 with eye goggles to enhance the communication between the teams. CONCLUSIONS: The study shed the light on challenges to implement the AHA COVID-19-related Interim Resuscitation Guideline. The in-situ simulation was an effective approach for rapid training and identifying unreliable equipment, ineffective and inefficient workflow, and managing the complexity of the physical environment.

2. Int J Emerg Med. 2022 Jun 9;15(1):26. doi: 10.1186/s12245-022-00429-1.
Impact of the COVID-19 outbreak on out-of-hospital cardiac arrest management and outcomes in a low-resource emergency medical service system: a perspective from Thailand.
Riyapan S(1)(2), Chantanakomes J(1)(2), Roongsaenthong P(1), Tianwibool P(3), Wittayachamnankul B(3), Supasaovapak J(4), Pansiritanachot W(5)(6).
ABSTRACT
BACKGROUND: The impact of the coronavirus disease 2019 (COVID-19) outbreak on out-of-hospital cardiac arrest (OHCA) has been of interest worldwide. However, evidence from low-resource emergency medical service systems is limited. This study investigated the effects of the COVID-19 outbreak on the prehospital management and outcomes of OHCA in Thailand. METHODS: This multicentered, retrospective, observational study compared the management and outcomes of OHCA for 2 periods: pre-COVID-19 (January-September 2019) and during the outbreak (January-September 2020). Study data were obtained from the Thai OHCA Network Registry. The primary outcome was survival rate to hospital discharge. Data of other OHCA outcomes and prehospital care during the two periods were also compared. RESULTS: The study enrolled 691 patients: 341 (49.3%) in the pre-COVID-19 period and 350 (50.7%) in the COVID-19 period. There was a significant decrease in the survival rate to discharge during the COVID-19 outbreak (7.7% vs 2.2%; adjusted odds ratio [aOR], 0.34; 95% confidence interval [CI], 0.15-0.95). However, there were no significant

differences between the 2 groups in terms of their rates of sustained return of spontaneous circulation (33.0% vs 31.3%; aOR, 1.01; 95% CI, 0.68-1.49) or their survival to intensive care unit/ward admission (27.8% vs 19.8%; aOR, 0.78; 95% CI, 0.49-1.15). The first-responder response interval was significantly longer during the COVID-19 outbreak (median [interquartile range] 5.3 [3.2-9.3] min vs 10 [6-14] min; P < 0.001). There were also significant decreases in prehospital intubation (66.7% vs 48.2%; P < 0.001) and prehospital drug administration (79.5% vs 70.6%; P = 0.024) during the COVID-19 outbreak. CONCLUSION: There was a significant decrease in the rate of survival to hospital discharge of patients with OHCA during the COVID-19 outbreak in Thailand. Maintaining the first responder response quality and encouraging prehospital advanced airway insertion might improve the survival rate during the COVID-19 outbreak.

3. Resusc Plus. 2022 May 30;10:100256. doi: 10.1016/j.resplu.2022.100256. Online ahead of print.
Impact of the COVID-19 pandemic on public attitudes to cardiopulmonary resuscitation and publicly accessible defibrillator use in the UK.
Hawkes CA(1), Kander I(1), Contreras A(1), Ji C(1), Brown TP(1), Booth S(1), Niroshan Siriwardena A(2), Fothergill RT(3), Williams J(4), Rees N(5), Stephenson E(6), Perkins GD(1)(7).
NO ABSTRACT AVAILABLE

4. Am J Emerg Med. 2022 Jul;57:114-123. doi: 10.1016/j.ajem.2022.04.031. Epub 2022 Apr 27.
Clinical update on COVID-19 for the emergency clinician: Cardiac arrest in the out-of-hospital and in-hospital settings.
Brady WJ(1), Chavez S(2), Gottlieb M(3), Liang SY(4), Carius B(5), Koyfman A(6), Long B(7).
ABSTRACT
INTRODUCTION: Coronavirus disease of 2019 (COVID-19) has resulted in millions of cases worldwide. As the pandemic has progressed, the understanding of this disease has evolved. Its impact on the health and welfare of the human population is significant; its impact on the delivery of healthcare is also considerable. OBJECTIVE: This article is another paper in a series addressing COVID-19-related updates to emergency clinicians on the management of COVID-19 patients with cardiac arrest. DISCUSSION: COVID-19 has resulted in significant morbidity and mortality worldwide. From a global perspective, as of February 23, 2022, 435 million infections have been noted with 5.9 million deaths (1.4%). Current data suggest an increase in the occurrence of cardiac arrest, both in the outpatient and inpatient settings, with corresponding reductions in most survival metrics. The frequency of out-of-hospital lay provider initial care has decreased while non-shockable initial cardiac arrest rhythms have increased. While many interventions, including chest compressions, are aerosol-generating procedures, the risk of contagion to healthcare personnel is low, assuming appropriate personal protective equipment is used; vaccination with boosting provides further protection against contagion for the healthcare personnel involved in cardiac arrest resuscitation. The burden of the COVID-19 pandemic on the delivery of cardiac arrest care is considerable and, despite multiple efforts, has adversely impacted the chain of survival. CONCLUSION: This review provides a focused update of cardiac arrest in the setting of COVID-19 for emergency clinicians.

5. Am J Emerg Med. 2022 Jul;57:222. doi: 10.1016/j.ajem.2022.02.026. Epub 2022 Feb 19.
Leg-heel chest compression as an alternative for medical professionals in times of COVID-19.
Wong MF(1), Ho MP(2).
NO ABSTRACT AVAILABLE

CPR/MECHANICAL CHEST COMPRESSION

No articles identified.

REGISTRIES, REVIEWS AND EDITORIALS

1. Curr Opin Crit Care. 2022 Jun 1;28(3):262-269. doi: 10.1097/MCC.0000000000000934.
Cardiac arrest centres: what, who, when, and where?
Ho AFW(1)(2), Yeo JW(3), Ong MEH(1)(4).
ABSTRACT
PURPOSE OF REVIEW: Cardiac arrest centres (CACs) may play a key role in providing postresuscitation care, thereby improving outcomes in out-of-hospital cardiac arrest (OHCA). There is no consensus on CAC definitions or the optimal CAC transport strategy despite advances in research. This review provides an updated overview of CACs, highlighting evidence gaps and future research directions. RECENT FINDINGS: CAC definitions vary worldwide but often feature 24/7 percutaneous coronary intervention capability, targeted temperature management, neuro-prognostication, intensive care, education, and research within a centralized, high-volume hospital. Significant evidence exists for benefits of CACs related to regionalization. A recent meta-analysis demonstrated clearly improved survival with favourable neurological outcome and survival among patients transported to CACs with conclusions robust to sensitivity analyses. However, scarce data exists regarding 'who', 'when', and 'where' for CAC transport strategies. Evidence for OHCA patients without ST elevation postresuscitation to be transported to CACs remains unclear. Preliminary evidence demonstrated greater benefit from CACs among patients with shockable rhythms. Randomized controlled trials should evaluate specific strategies, such as bypassing nearest hospitals and interhospital transfer. SUMMARY: Real-world study designs evaluating CAC transport strategies are needed. OHCA patients with underlying culprit lesions, such as those with ST-elevation myocardial infarction (STEMI) or initial shockable rhythms, will likely benefit the most from CACs.

2. Curr Opin Crit Care. 2022 Jun 1;28(3):244-249. doi: 10.1097/MCC.0000000000000943.
Temperature control after cardiac arrest: friend or foe.
Nolan JP(1)(2), Soar J(3).
ABSTRACT
PURPOSE OF REVIEW: Most patients who are successfully resuscitated after cardiac arrest are initially comatose and require mechanical ventilation and other organ support in an ICU. Best practice has been to cool these patients and control their temperature at a constant value in the range of 32-36 oC for at least 24 h. But the certainty of the evidence for this practice is increasingly being challenged. This review will summarize the evidence on key aspects of temperature control in comatose postcardiac arrest patients. RECENT FINDINGS: The Targeted Temperature Management 2 (TTM-2) trial documented no difference in 6-month mortality among comatose postcardiac arrest patients managed at 33 oC vs. targeted normothermia. A systematic review and meta-analysis completed by the Advanced Life Support (ALS) Task Force of the International Liaison Committee on Resuscitation (ILCOR) concluded that temperature control with a target of 32-34 °C did not improve survival or favourable functional outcome after cardiac arrest. Two observational studies have documented an association between predicted moderate hypoxic-ischaemic brain injury and better outcome with temperature control at 33-34 oC compared with 35-36 oC. SUMMARY: We suggest actively preventing fever by targeting a temperature 37.5 oC or less for those patients who remain comatose following return of spontaneous circulation (ROSC) after cardiac arrest.

3. Am J Health Syst Pharm. 2022 Jun 7;79(12):935-943. doi: 10.1093/ajhp/zxac011.
Current and investigational therapies for the treatment of refractory ventricular fibrillation.
Scaturo N(1), Shomo E(1), Frank M(2)(3).
ABSTRACT
PURPOSE: Esmolol, dual sequential defibrillation, vector change defibrillation, and left stellate ganglion block are presented and reviewed for the treatment of refractory ventricular fibrillation. SUMMARY: Although no formal definition has been established for refractory ventricular fibrillation, the literature describes it as a pulseless ventricular arrhythmia that persists despite 3 standard defibrillation attempts, administration of amiodarone 300 mg intravenously, and provision of three 1-mg intravenous doses of epinephrine. Evolving literature surrounding resuscitation in this particular subset of cardiac arrest challenges the efficacy of traditional therapies, such as epinephrine, and suggests that other treatment modalities may improve outcomes. Case reports, case series, and small retrospective studies have pointed to benefit when utilizing a variety of therapies, namely, esmolol, dual sequential defibrillation, vector change defibrillation, or left stellate ganglion block, in patients with refractory ventricular fibrillation arrest. CONCLUSION: A mounting, although limited, body of evidence suggests that esmolol, dual sequential defibrillation, vector change defibrillation, or left stellate ganglion block may be effective at terminating refractory ventricular fibrillation and improving patient outcomes. Further evidence is required before these therapies can be adopted as standard practice; however, as key members of the code response team, it is imperative for pharmacists to be familiar with the supporting evidence, safety considerations, and logistical challenges of utilizing these treatments during arrest.

4. Am J Cardiol. 2022 May 31:S0002-9149(22)00413-1. doi: 10.1016/j.amjcard.2022.03.055. Online ahead of print.
Prevalence of Coronary Artery Anomalies in Young and Middle-Aged Sudden Cardiac Death Victims (from a Prospective State-Wide Registry).
Paratz ED(1), van Heusden A(2), Zentner D(3), Morgan N(4), Smith K(5), Ball J(6), Thompson T(7), James P(7), Connell V(8), Pflaumer A(9), Semsarian C(10), Ingles J(11), Stub D(12), Parsons S(13), La Gerche A(14).
ABSTRACT
Coronary artery anomalies (CAAs) have been previously implicated as a major cause of young sudden cardiac death (SCD), particularly in exercise-related SCD, with a prevalence of up to 33%. A state-wide prospective out-of-hospital cardiac arrest registry identified all patients aged 1 to 50 years who experienced an SCD and underwent autopsy from April 2019 to April 2021. Rates of normal anatomy, normal variants, and CAAs were identified, and circumstances and causes of death for patients with CAAs examined. Of 1,477 patients who experienced cardiac arrest during the study period, 490 underwent autopsy and were confirmed to have experienced SCD. Of these 490 patients, 5 (1%) had a CAA identified, with 3 having anomalies of coronary origin and 2 having anomalies of coronary course. In no cases were the CAA deemed responsible for the SCD. In 2 cases, severe coronary disease and intra-coronary thrombus with histological evidence of acute myocardial infarction were identified. In the third, critical coronary disease was found, the fourth had an unrelated thoracic aortic dissection, and the fifth had cardiomegaly in the setting of illicit drug use. Of 27 patients who experienced their SCD during exercise, only 1 had a CAA identified (the patient with thoracic aortic dissection). In conclusion, in this prospective cohort of consecutive young patients with SCD who underwent autopsy, CAAs occurred in 1% of patients and did not cause any deaths. The role of CAAs in causing young and middle-aged SCD appears to be less significant than previously hypothesized.

5. Eur Heart J Acute Cardiovasc Care. 2022 Jun 7;11(4):293-302. doi: 10.1093/ehjacc/zuac028.
Does age influence out-of-hospital cardiac arrest incidence and outcomes among women? Insights from the Paris SDEC.
Lavignasse D(1), Lemoine S(2), Karam N(1)(3), Gaye B(1), Bougouin W(1)(4), Beganton F(1), Jabre P(1)(5), Loeb T(6), Agostinucci JM(7), Dumas F(1)(8), Lecarpentier E(9), Jost D(3), Cariou A(1)(10), Marijon E(1)(3), Empana JP(1), Jouven X(1)(3).
ABSTRACT
AIMS: Age and sex disparities in out-of-hospital cardiac arrest (OHCA) have been described. Reproductive age may have a protected effect on females vs. males, although results are conflicting. We aimed to clarify this using the Paris Sudden Death Expertise Centre (SDEC) registry. METHODS AND RESULTS: The Paris SDEC registry collects OHCAs occurring in the Greater Paris Area. We included all OHCAs of presumed cardiac causes occurring between 2013 and 2018. Patients were divided into age groups: 1-13, 13-50, 50-75, and >75 years. Sex and age disparities in OHCA incidence and outcomes were analysed using multivariable negative binomial and logistic regression models. There were 19 782 OHCAs meeting inclusion criteria: 0.37% aged 1-13 years, 12.4% aged 13-50 years, 40.4% aged 50-75 years, and 46.9% aged >75 years. Adjusted incidence rate ratios (IRRs) in females vs. males were for the youngest to the older age groups: 1.29 [95% confidence interval (CI) 0.78-2.13], 0.54 [0.49-0.59], 0.60 [0.56-0.64], and 0.75 [0.67-0.84]. At reproductive age, females were more likely than males to have a return of spontaneous circulation [adjusted odds ratio (OR) 1.60 (1.27-2.02)], to be alive at hospital admission [OR: 1.49 (1.18-1.89)]. In both sexes, patients aged 13-50 years were more likely to survive at hospital discharge than those aged 50-75 years [males: OR 1.81 (1.49-2.20), females: 2.24 (1.54-3.25)]. However, at reproductive age, no sex disparity was observed in survival at hospital discharge [OR: 1.16 (0.75-1.80)]. CONCLUSION: Incidence rate ratios were similar between pre- and post-menopausal aged patients. At reproductive age, no sex disparity in survival at hospital discharge was observed, suggesting that menopausal status may not influence OHCA occurrence and prognosis.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2022 Jun 4:S0300-9572(22)00171-X. doi: 10.1016/j.resuscitation.2022.06.001. Online ahead of print.
Association of Pulmonary Hypertension with Survival and Neurologic Outcomes in Adults with In-Hospital Cardiac Arrest.
Patel JK(1), Ramkishun CA(2), Haw A(2), Mehta K(2), Hou W(2), Parikh PB(2).
ABSTRACT
BACKGROUND: Pulmonary hypertension (PH) has been associated with poor survival in multiple cardiopulmonary conditions, however its association with outcomes in cardiac arrest remains unknown. We aimed to evaluate the association of PH with survival and neurologic outcomes in adults with in-hospital cardiac arrest (IHCA). METHODS: The study population included adults with IHCA undergoing resuscitation at an academic tertiary medical center from 2011-2019. Patients were classified based upon the presence versus absence of PH, defined as a pulmonary artery systolic pressure > 35mmHg on pre-arrest echocardiogram. Survival to discharge and favorable neurological outcome (defined as a Glasgow Outcome Score of 4-5) served as the primary and secondary outcomes of interest respectively. RESULTS: Of the 371 patients studied, 203 (54.7%) had PH while 168 (45.3%) did not. Patients with PH had higher Charlson Comorbidity Score with higher rates of multiple baseline comorbidities. They also had worse multi-chamber enlargement, left ventricular diastolic dysfunction, right ventricular systolic dysfunction, and valvular heart disease compared to non-PH patients. Rates of survival to discharge (11.5% vs 10.9%, p=0.881) and favorable neurologic outcome (8.0% vs 6.2%, p=0.550) were similar in PH and non-PH patients

respectively. In multivariable analysis, PH was not associated with survival to discharge (OR 1.23, 95%CI 0.57-2.65) or favorable neurologic outcome (OR 1.69, 95%CI 0.64 - 4.45). CONCLUSIONS: In this contemporary registry of adults with IHCA, while PH was associated with a higher risk patient profile, it was not associated with survival or neurologic outcomes in this population.

2. Crit Care Med. 2022 Jun 10. doi: 10.1097/CCM.0000000000005593. Online ahead of print.
Right-to-Left Shunts Occur During Cardiopulmonary Resuscitation: Echocardiographic Observations.
Jung WJ(1), Cha KC(1), Roh YI(1), Bae KS(1), Kwon TH(1), Han JH(2), Hwang SO(1).
ABSTRACT
OBJECTIVES: A significant proportion of the population has a patent foramen ovale (PFO). The intracardiac pressure during cardiopulmonary resuscitation (CPR) may differ from that of normal circulation, which may result in a right-to-left shunt in the presence of a PFO. In this study, transesophageal echocardiography (TEE) was conducted to evaluate whether CPR carried out in patients after cardiac arrest causes right-to-left shunt. DESIGN: A retrospective observational study. SETTING: One academic medical center from January 2017 to April 2020. PATIENTS: Patients older than 20 years who suffered from nontraumatic out-of-hospital cardiac arrest (OHCA) and underwent intra-arrest TEE. MEASUREMENT AND MAIN RESULTS: Patients who had microbubbles resulting from fluid injection in the right atrium, as indicated on TEE imaging, were included in the analysis. The presence of right-to-left shunt was defined as the appearance of microbubbles in the systemic circulation, including the left atrium, left ventricle, or aorta. A total of 97 patients were included in the final analysis. A right-to-left shunt was observed in 21 patients (21.6%), and no shunt was found in 76 patients (78.4%). The degree of the right-to-left shunt, determined by the number of microbubbles, was mild in 11 patients (52.4%), moderate in eight (38.0%), and severe in two (9.6%). Multivariate analysis showed that no factors were associated with the presence of right-to-left shunt during CPR. CONCLUSIONS: Right-to-left shunts can be appreciated during CPR in patients who experience OHCA. Further studies are needed to verify its clinical significance.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Medicine (Baltimore). 2022 Jun 3;101(22):e29161. doi: 10.1097/MD.0000000000029161.
Risk of hypertension and treatment on out-of-hospital cardiac arrest incidence: A case-control study.
Kim J(1)(2), Cho SI(2)(3), Park JH(1), Song J(1), Ahn S(1), Cho H(1), Moon S(1).
ABSTRACT
Hypertension (HTN) is a high risk factor for major cardiovascular adverse events. This study aimed to investigate the effect of HTN risk on out-of-hospital cardiac arrest (OHCA) incidence and determine whether the effect of HTN on OHCA incidence differs according to antihypertensive medication. This case-control study used the Korean Cardiac Arrest Resuscitation Consortium and Korean Community Health Survey (CHS). Cases were defined as emergency medical service-treated adult OHCA patients presumed to have a cardiac etiology from 2015 to 2017. Patients without information on HTN diagnosis were excluded from the study. The Korean CHS database's controls were matched at a 1:2 ratio with strata, including age, gender, and county of residence. Multivariable conditional logistic regression analysis was conducted to estimate HTN risk and antihypertensive treatment on OHCA

incidence,A total of 2633 OHCA patients and 5266 community-based controls were enrolled in this study. Among them, 1176 (44.7%) patients and 2049 (38.9%) controls were diagnosed with HTN. HTN was associated with an increased risk of OHCA (adjusted odds ratio [AOR]: 1.19 [1.07-1.32]). On comparing HTN with or without the antihypertensive treatment group with the non-HTN-diagnosed group (as a reference), the HTN without treatment group had the highest AOR (95% confidence interval) (3.41 [2.74-4.24]). The AOR in the HTN treatment group was reduced to that in the non-HTN-diagnosed group (0.96 [0.86-1.08]).HTN increased OHCA risk, and the HTN without treatment group had the highest OHCA risk. Conversely, OHCA risk decreased to the non-HTN-diagnosed group level with HTN treatment.

2. Int J Cardiol Heart Vasc. 2022 May 26;41:101059. doi: 10.1016/j.ijcha.2022.101059. eCollection 2022 Aug.

Outcome after out-of-hospital cardiac arrest in patients with ischaemic and non-ischaemic heart disease: A Danish tertiary-center cohort study.

Guldfeldt MB(1)(2), Frederiksen TC(1)(2), Broendberg AK(1)(2), Christiansen MK(1)(2), Jensen HK(1)(2).

ABSTRACT

BACKGROUND: Mortality following out-of-hospital cardiac arrest (OHCA) is high, and studies on return to work show varying results. It remains uncertain whether mortality and return to work differs between patients with ischaemic heart disease (IHD) and non-ischaemic heart disease (non-IHD). AIM: To investigate all-cause mortality, cardiac death, and return to work among patients admitted after OHCA with IHD and non-IHD. METHODS: We included 234 consecutive patients admitted to Aarhus University Hospital with OHCA, who were not declared dead in the prehospital setting or upon arrival. Patients were divided into an IHD and a non-IHD group based on history of myocardial infarction, percutaneous coronary intervention, coronary artery bypass graft surgery, or signs of obstructive IHD on the admission coronary angiography. Outcome in terms of all-cause mortality, cardiac death, and return to work was evaluated. RESULTS: All-cause mortality after one month, one year, and five years was 41.9%, 49.1%, and 54.3%. There was no difference in all-cause mortality or cardiac death between IHD and non-IHD patients (all-cause mortality: adjusted HR 0.78, 95% CI, 0.53-1.14; P = 0.19) and cardiac death: adjusted HR 0.93, 95% CI, 0.60-1.43; P = 0.73). Among patients working prior to OHCA the cumulative incidence of patients returning to work was 62.3% after five years with no statistically significant difference between groups. CONCLUSION: A favourable outcome was observed in patients admitted after OHCA with a non-significant trend toward a higher mortality in non-IHD patients, possibly indicating that IHD is a favourable cause of cardiac arrest.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

1. Ann Intensive Care. 2022 Jun 6;12(1):48. doi: 10.1186/s13613-022-01023-7.

Organ donation after out-of-hospital cardiac arrest: a population-based study of data from the Paris Sudden Death Expertise Center.

Renaudier M(1)(2), Binois Y(1)(2), Dumas F(1)(2)(3)(4), Lamhaut L(1)(2)(4)(5), Beganton F(1)(2), Jost D(1)(2)(6), Charpentier J(7), Lesieur O(4)(8), Marijon E(1)(2)(4)(9), Jouven X(1)(2)(4)(9), Cariou A(10)(11)(12)(13), Bougouin W(1)(2)(14); Paris Sudden Death Expertise Center group.

ABSTRACT

BACKGROUND: Organ shortage is a major public health issue, and patients who die after out-of-hospital cardiac arrest (OHCA) could be a valuable source of organs. Here, our objective was to identify factors associated with organ donation after brain death complicating OHCA, in unselected patients entered into a comprehensive real-life registry covering a well-defined geographic area. METHODS: We prospectively analyzed consecutive adults with OHCA who were successfully resuscitated, but died in intensive care units in the Paris region in 2011-2018. The primary outcome was organ donation after brain death. Independent risk factors were identified using logistic regression analysis. One-year graft survival was assessed using Cox and log-rank tests. RESULTS: Of the 3061 included patients, 136 (4.4%) became organ donors after brain death, i.e., 28% of the patients with brain death. An interaction between admission pH and post-resuscitation shock was identified. By multivariate analysis, in patients with post-resuscitation shock, factors associated with organ donation were neurological cause of OHCA (odds ratio [OR], 14.5 [7.6-27.4], P < 0.001), higher pH (OR/0.1 increase, 1.3 [1.1-1.6], P < 0.001); older age was negatively associated with donation (OR/10-year increase, 0.7 [0.6-0.8], P < 0.001). In patients without post-resuscitation shock, the factor associated with donation was neurological cause of OHCA (OR, 6.9 [3.0-15.9], P < 0.001); higher pH (OR/0.1 increase, 0.8 [0.7-1.0], P = 0.04) and OHCA at home (OR, 0.4 [0.2-0.7], P = 0.006) were negatively associated with organ donation. One-year graft survival did not differ according to Utstein characteristics of the donor. CONCLUSIONS: 4% of patients who died in ICU after OHCA led to organ donation. Patients with OHCA constitute a valuable source of donated organs, and special attention should be paid to young patients with OHCA of neurological cause.

FEEDBACK

No articles identified.

DRUGS

1. PLoS One. 2022 Jun 8;17(6):e0267016. doi: 10.1371/journal.pone.0267016. eCollection 2022.

Acetylsalicylic acid use is associated with reduced risk of out-of-hospital cardiac arrest in the general population: Real-world data from a population-based study.

Eroglu TE(1)(2)(3), Blom MT(1), Souverein PC(2), Yasmina A(4), de Boer A(2), Tan HL(1)(5); ESCAPE-NET investigators.

ABSTRACT

AIM: Activated blood platelet products facilitate myocardial intracellular Ca2+ overload, thereby provoking afterdepolarizations and increasing susceptibility of ischemic myocardium to ventricular fibrillation (VF). These effects are counteracted in vitro by acetylsalicylic acid (ASA), but no prior study investigated whether ASA is associated with decreased out-of-hospital cardiac arrest (OHCA) risk on a population level. Therefore, we studied whether ASA and other antiplatelet drugs (carbasalate calcium, clopidogrel) are associated with decreased risk of OHCA. METHODS: We conducted a population-based case-control study among individuals (772 OHCA-cases with documented VT/VF, 2444 non-OHCA-controls) who had used antiplatelet drugs in the year before index-date (OHCA-date), and studied the association between current antiplatelet drug use and OHCA-risk with multivariable logistic regression analysis. RESULTS: ASA use was associated with

reduced OHCA-risk (adjusted odds ratio (ORadj) 0.6 [0.5-0.8]), and more so in women (ORadj 0.3 [0.2-0.6]) than in men (ORadj 0.7 [0.5-0.95], Pinteraction 0.021). Carbasalate calcium was associated with decreased OHCA-risk in women (ORadj 0.5 [0.3-0.9]), but not in men (ORadj 1.3 [0.96-1.7], Pinteraction 0.005). Clopidogrel was not associated with reduction in OHCA-risk. Risk reduction associated with ASA in patients with OHCA was similar in the presence of acute myocardial infarction (AMI) (ORadj 0.6 [0.4-0.9]) and in the absence of AMI (ORadj 0.7 [0.4-1.2]). CONCLUSION: ASA use was associated with reduced OHCA-risk in both sexes, and more so in women, while carbasalate calcium only protected women. Clopidogrel was not associated with reduced OHCA-risk.

TRAUMA

No articles identified.

VENTILATION

1. PLoS One. 2022 Jun 6;17(6):e0269599. doi: 10.1371/journal.pone.0269599. eCollection 2022.
Association of prehospital airway management technique with survival outcomes of out-of-hospital cardiac arrest patients.
Jung E(1), Ro YS(2), Ryu HH(1)(3), Shin SD(2).
ABSTRACT
INTRODUCTION: Despite numerous studies on airway management in out-of-hospital cardiac arrest (OHCA) patients, the choice of prehospital airway management technique remains controversial. Our study aimed to investigate the association between prehospital advanced airway management and survival outcomes according to a transport time interval (TTI) using nationwide OHCA registry database in Korea. METHODS: The inclusion criteria were patients with OHCA aged over 18 years old with a presumed cardiac etiology between January 2015 and December 2018. The primary outcome was survival to hospital discharge. The main exposure was the prehospital airway management technique performed by the emergency medical technicians (EMTs), classified as bag-valve mask (BVM), supraglottic airway (SGA), or endotracheal intubation (ETI).We performed multivariable logistic regression analysis and interaction analysis between the type of airway management and TTI for adjusted odds ratios (aORs) and 95% confidence intervals (CIs). RESULTS: Of a total of 70,530 eligible OHCA patients, 26,547 (37.6%), 38,391 (54.4%), and 5,592 (7.9%) were managed with BVM, SGA, ETI, respectively. Patients in the SGA and ETI groups had a higher odds of survival to discharge than BVM groups (aOR, 1.11 (1.05-1.16) and 1.13 (1.05-1.23)). And the rates of survival to discharge with SGA and ETI were significantly higher in groups with TTI more than 8 minutes (1.17 (1.08-1.27) and 1.38 (1.20-1.59)). CONCLUSION: The survival to discharge was significantly higher among patients who received ETI and SGA than in those who received BVM. The transport time interval influenced the effect of prehospital airway management on the clinical outcomes after OHCA.

CERERBRAL MONITORING

1. Resusc Plus. 2022 Jun 2;10:100258. doi: 10.1016/j.resplu.2022.100258. eCollection 2022 Jun.
Biomarkers of brain injury after cardiac arrest; a statistical analysis plan from the TTM2 trial biobank investigators.
Moseby-Knappe M(1), Levin H(2), Blennow K(3)(4), Ullén S(5), Zetterberg H(3)(4)(6)(7)(8), Lilja G(1), Dankiewicz J(9), Jakobsen JC(10)(11), Lagebrant A(1), Friberg H(12), Nichol A(13)(14)(15), Ainschough K(13), Eastwood GM(16)(17), Wise MP(18), Thomas M(19), Keeble T(20)(21), Cariou A(22), Leithner

C(23), Rylander C(24), Düring J(12), Bělohlávek J(25), Grejs A(26)(27), Borgquist O(28), Undén J(29), Simon M(30), Rolny V(31), Piehler A(31), Cronberg T(1), Nielsen N(32).

ABSTRACT

BACKGROUND: Several biochemical markers in blood correlate with the magnitude of brain injury and may be used to predict neurological outcome after cardiac arrest. We present a protocol for the evaluation of prognostic accuracy of brain injury markers after cardiac arrest. The aim is to define the best predictive marker and to establish clinically useful cut-off levels for routine implementation. METHODS: Prospective international multicenter trial within the Targeted Hypothermia versus Targeted Normothermia after Out-of-Hospital Cardiac Arrest (TTM2) trial in collaboration with Roche Diagnostics International AG. Samples were collected 0, 24, 48, and 72 hours after randomisation (serum) and 0 and 48 hours after randomisation (plasma), and pre-analytically processed at each site before storage in a central biobank. Routine markers neuron-specific enolase (NSE) and S100B, and neurofilament light, total-tau and glial fibrillary acidic protein will be batch analysed using novel Elecsys® electrochemiluminescence immunoassays on a Cobas e601 instrument. RESULTS: Statistical analysis will be reported according to the Standards for Reporting Diagnostic accuracy studies (STARD) and will include comparisons for prediction of good versus poor functional outcome at six months post-arrest, by modified Rankin Scale (0-3 vs. 4-6), using logistic regression models and receiver operating characteristics curves, evaluation of mortality at six months according to biomarker levels and establishment of cut-off values for prediction of poor neurological outcome at 95-100% specificities. CONCLUSIONS: This prospective trial may establish a standard methodology and clinically appropriate cut-off levels for the optimal biomarker of brain injury which predicts poor neurological outcome after cardiac arrest.

2. Emerg Med J. 2022 Jun 6:emermed-2020-210864. doi: 10.1136/emermed-2020-210864. Online ahead of print.

Prehospital ABC (Age, Bystander and Cardiogram) scoring system to predict neurological outcomes of cardiopulmonary arrest on arrival: post hoc analysis of a multicentre prospective observational study.

Uehara K(1), Tagami T(2), Hyodo H(3), Ohara T(3), Sakurai A(4), Kitamura N(5), Nakada TA(6), Takeda M(7), Yokota H(8), Yasutake M(3).

ABSTRACT

BACKGROUND: There is currently limited evidence to guide prehospital identification of patients with cardiopulmonary arrest on arrival (CPAOA) to hospital who have potentially favourable neurological function. This study aimed to develop a simple scoring system that can be determined at the contact point with emergency medical services to predict neurological outcomes. METHODS: We analysed data from patients with CPAOA using a regional Japanese database (SOS-KANTO), from January 2012 to March 2013. Patients were randomly assigned into derivation and validation cohorts. Favourable neurological outcomes were defined as cerebral performance category 1 or 2. We developed a new scoring system using logistic regression analysis with the following predictors: age, no-flow time, initial cardiac rhythm and arrest place. The model was internally validated by assessing discrimination and calibration. RESULTS: Among 4907 patients in the derivation cohort and 4908 patients in the validation cohort, the probabilities of favourable outcome were 0.9% and 0.8%, respectively. In the derivation cohort, age ≤70 years (OR 5.11; 95% CI 2.35 to 11.14), no-flow time ≤5 min (OR 4.06; 95% CI 2.06 to 8.01) and ventricular tachycardia or fibrillation as initial cardiac rhythm (OR 6.66; 95% CI 3.45 to 12.88) were identified as predictors of favourable outcome. The ABC score consisting of Age, information from Bystander and Cardiogram was created. The areas under the receiver operating characteristic curves of this score were 0.863 in the derivation and 0.885 in the validation cohorts. Positive likelihood ratios were 6.15 and 6.39 in patients with scores

>2 points and were 11.06 and 17.75 in those with 3 points. CONCLUSION: The ABC score showed good accuracy for predicting favourable neurological outcomes in patients with CPAOA. This simple scoring system could potentially be used to select patients for extracorporeal cardiopulmonary resuscitation and minimise low-flow time.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Ther Hypothermia Temp Manag. 2022 Jun;12(2):61-67. doi: 10.1089/ther.2021.0003. Epub 2021 May 11.

Gaps in the Provision of Cognitive and Psychological Resources in Cardiac Arrest Survivors with Good Neurologic Recovery.

Presciutti A(1)(2), Newman MM(3), Sawyer KN(4), Agarwal S(5), Perman SM(2).

ABSTRACT

We aimed to elucidate gaps in the provision of cognitive and psychological resources in cardiac arrest survivors. We conducted an online survey study between October 29, 2019, and November 15, 2019 with cardiac arrest survivors and caregiver members of the Sudden Cardiac Arrest Foundation. We queried survivors as to whether they experienced cognitive or psychological symptoms since their cardiac arrest. Next, we queried both survivors and caregivers on the provision of resources through three metrics: (1) discussions with providers about potential cognitive or psychological symptoms, (2) neurologist or psychologist appointments scheduled by providers, and (3) mental health referrals by providers. We then ran Chi-square goodness-of-fit tests to compare the proportion of survivors and caregivers who reported resource provision (observed values) to the proportion of survivors who reported experiencing cognitive and psychological symptoms, respectively (expected values). We included responses from 167 survivors and 52 caregivers. A total of 73.1% (n = 122) survivors reported experiencing cognitive symptoms and 67.1% (n = 112) psychological symptoms since their cardiac arrest. When compared to these two proportions, provision of resources was significantly lower in all three metrics: (1) fewer discussions with providers about potential for developing cognitive symptoms (31%) and psychological symptoms (26.3%), (2) fewer neurologist appointments scheduled (8.4%) and psychologist appointments scheduled (4.8%), and (3) fewer referrals to mental health (6%). Informal caregivers also reported significantly lower provision of resources in all three metrics, with the exception of discussions about developing cognitive symptoms. Our results suggest that there are discrepancies in the provision of cognitive and psychological resources in cardiac arrest survivors with good neurologic recovery. Systematic referral processes may be needed to standardize resource provision to consistently meet the pervasive cognitive and psychological needs of cardiac arrest survivors.

2. J Clin Med. 2022 Jun 2;11(11):3163. doi: 10.3390/jcm11113163.

The Impact of Withdrawn vs. Agitated Relatives during Resuscitation on Team Workload: A Single-Center Randomised Simulation-Based Study.

Sellmann T(1)(2), Oendorf A(3)(4), Wetzchewald D(3), Schwager H(3), Thal SC(2)(5), Marsch S(6).

ABSTRACT

BACKGROUND: Guidelines recommend that relatives be present during cardiopulmonary resuscitation (CPR). This randomised trial investigated the effects of two different behaviour

patterns of relatives on rescuers' perceived stress and quality of CPR. MATERIAL AND METHODS: Teams of three to four physicians were randomised to perform CPR in the presence of no relatives (control group), a withdrawn relative, or an agitated relative, played by actors according to a scripted role, and to three different models of leadership (randomly determined by the team or tutor or left open). The scenarios were video-recorded. Hands-on time was primary, and the secondary outcomes comprised compliance to CPR algorithms, perceived workload, and the influence of leadership. RESULTS: 1229 physicians randomised to 366 teams took part. The presence of a relative did not affect hands-on time (91% [87-93] vs. 92% [88-94] for "withdrawn" and 92 [88-93] for "agitated" relatives; p = 0.15). The teams interacted significantly less with a "withdrawn" than with an "agitated" relative (11 [7-16]% vs. 23 [15-30]% of the time spent for resuscitation, p < 0.01). The teams confronted with an "agitated" relative showed more unsafe defibrillations, higher ventilation rates, and a delay in starting CPR (all p < 0.05 vs. control). The presence of a relative increased frustration, effort, and perceived temporal demands (all <0.05 compared to control); in addition, an "agitated" relative increased mental demands and total task load (both p < 0.05 compared to "withdrawn" and control group). The type of leadership condition did not show any effects. CONCLUSIONS: Interaction with a relative accounted for up to 25% of resuscitation time. Whereas the presence of a relative per se increased the task load in different domains, only the presence of an "agitated" relative had a marginal detrimental effect on CPR quality.

3. Acute Med Surg. 2022 May 27;9(1):e760. doi: 10.1002/ams2.760. eCollection 2022 Jan-Dec.
Clustering out-of-hospital cardiac arrest patients with non-shockable rhythm by machine learning latent class analysis.
Okada Y(1)(2), Komukai S(3), Kitamura T(4), Kiguchi T(5), Irisawa T(6), Yamada T(7), Yoshiya K(8), Park C(9), Nishimura T(10), Ishibe T(11), Yagi Y(12), Kishimoto M(13), Inoue T(14), Hayashi Y(15), Sogabe T(16), Morooka T(17), Sakamoto H(18), Suzuki K(19), Nakamura F(20), Matsuyama T(21), Nishioka N(1), Kobayashi D(1), Matsui S(4), Hirayama A(22), Yoshimura S(1), Kimata S(1), Shimazu T(6), Ohtsuru S(2), Iwami T(1); CRITICAL Research Group Investigators.
ABSTRACT
AIM: We aimed to identify subphenotypes among patients with out-of-hospital cardiac arrest (OHCA) with initial non-shockable rhythm by applying machine learning latent class analysis and examining the associations between subphenotypes and neurological outcomes. METHODS: This study was a retrospective analysis within a multi-institutional prospective observational cohort study of OHCA patients in Osaka, Japan (the CRITICAL study). The data of adult OHCA patients with medical causes and initial non-shockable rhythm presenting with OHCA between 2012 and 2016 were included in machine learning latent class analysis models, which identified subphenotypes, and patients who presented in 2017 were included in a dataset validating the subphenotypes. We investigated associations between subphenotypes and 30-day neurological outcomes. RESULTS: Among the 12,594 patients in the CRITICAL study database, 4,849 were included in the dataset used to classify subphenotypes (median age: 75 years, 60.2% male), and 1,465 were included in the validation dataset (median age: 76 years, 59.0% male). Latent class analysis identified four subphenotypes. Odds ratios and 95% confidence intervals for a favorable 30-day neurological outcome among patients with these subphenotypes, using group 4 for comparison, were as follows; group 1, 0.01 (0.001-0.046); group 2, 0.097 (0.051-0.171); and group 3, 0.175 (0.073-0.358). Associations between subphenotypes and 30-day neurological outcomes were validated using the validation dataset. CONCLUSION: We identified four subphenotypes of OHCA patients with initial non-shockable rhythm. These patient subgroups presented with different characteristics associated with 30-day survival and neurological outcomes.

4. Cardiovasc J Afr. 2022 Jun 8;33:1-7. doi: 10.5830/CVJA-2022-019. Online ahead of print.

Out-of-hospital cardiac arrests in the city of Cape Town metropole of the Western Cape province of South Africa: a spatio-temporal analysis.

Stassen W(1), Theron E(2), Slingsby T(3), Wylie C(4).

ABSTRACT

BACKGROUND: The incidence of out-of-hospital cardiac arrest (OHCA) is expected to increase in sub-Saharan Africa along with the incidence of cardiovascular disease. In low-resource settings (LRS), OHCA carries a negligible survival rate. Interventions to improve OHCA survival might not be cost effective for many LRS, and therefore need to be targeted to areas of high incidence. The aim of this study was to describe the temporal and geographic distribution of OHCA in the City of Cape Town, South Africa, and their proximity to percutaneous coronary intervention (PCI) resources. METHODS: In this retrospective study, OHCA data between 1 January and 31 December 2018 were extracted from public and one private emergency medical services in the Western Cape. For temporal analysis, distribution of OHCA according to time of day, day of the week and month of the year were subjected to chi-squared testing. For geospatial analysis, cluster and outlier, and hotspot analyses were performed. Proximity analysis was employed to determine the driving time from OHCA location to the closest PCI-capable facility. RESULTS: A total of 929 patients with OHCA received an emergency medical services response in the City of Cape Town, corresponding to an annual prevalence of 23.2 per 100 000 persons. The distribution of OHCA incidence was not explained by month of the year ($p = 0.08$) or day of the week ($p = 0.67$). A statistically significant variation in OHCA incidence was explained by time of day ($p < 0.01$) with 30% ($n = 279$) of all OHCAs occurring from 05:00 to 09:59. Geospatial analysis yielded a large area of hotspots (99% confidence interval) over the centre of the metropole, Cape Flats and southern suburbs. The median (interquartile range) driving time from the incident to the closest PCI-capable facility was 10:22 (08:05) minutes. CONCLUSIONS: Incidents of OHCA occurred predominantly at home during the mid-morning, with hotspots around the city centre and residential suburbs of Cape Town. While the incidents occurred close to PCI-capable facilities, some areas remained underserved and access to PCI for OHCA victims may be impossible due to socio-economic factors. With an increase in OHCA incidence expected, it is essential that contextual, cost-effective management interventions be developed and implemented.

5. BMJ Open. 2022 Jun 9;12(6):e057175. doi: 10.1136/bmjopen-2021-057175.

Improving community-based first response to out of hospital cardiac arrest (FirstCPR): protocol for a cluster randomised controlled trial.

Munot S(1), Redfern J(2)(3), Bray JE(4), Angell B(3), Bauman A(5), Coggins A(6)(7), Denniss AR(7), Ferry C(8), Jennings G(9), Kovoor P(7), Kumar S(1)(7), Lai K(6), Khanlari S(10), Marschner S(1), Middleton PM(11)(12), Nelson M(10), Opperman I(13), Semsarian C(14), Taylor L(10), Vukasovic M(6), Ware S(15), Chow C(16)(3)(7).

ABSTRACT

INTRODUCTION: Out-of-hospital cardiac arrest (OHCA) is associated with poor survival outcomes, but prompt bystander action can more than double survival rates. Being trained, confident and willing-to-perform cardiopulmonary resuscitation (CPR) are known predictors of bystander action. This study aims to assess the effectiveness of a community organisation targeted multicomponent education and training initiative on being willing to respond to OHCAs. The study employs a novel approach to reaching community members via social and cultural groups, and the intervention aims to address commonly cited barriers to training including lack of availability, time and costs. METHODS AND ANALYSIS: FirstCPR is a cluster randomised trial that will be conducted across 200 community groups in urban and regional Australia. It will target community groups where CPR training is not usual. Community groups (clusters) will be stratified by region, size and organisation

type, and then randomly assigned to either immediately receive the intervention programme, comprising digital and in-person education and training opportunities about CPR and OHCA over 12 months, or a delayed programme implementation. The primary outcome is self-reported 'training and willingness-to-perform CPR' at 12 months. It will be assessed through surveys of group members that consent in intervention versus control groups and administered prior to control groups receiving the intervention. The primary analysis will follow intention-to-treat principles, use log binomial regression accounting for baseline covariates and be conducted at the individual level, while accounting for clustering within communities. Focus groups and interviews will be conducted to examine barriers and enablers to implementation and costs will also be examined. ETHICS AND DISSEMINATION: Ethical approval was obtained from The University of Sydney. Findings from this study will be disseminated via presentations at scientific conferences, publications in peer-reviewed journals, scientific and lay reports.

6. Clin Epidemiol. 2022 May 31;14:721-730. doi: 10.2147/CLEP.S366874. eCollection 2022.
Validation of ICD-9-CM and ICD-10-CM Diagnostic Codes for Identifying Patients with Out-of-Hospital Cardiac Arrest in a National Health Insurance Claims Database.
Tsai MJ(#)(1), Tsai CH(#)(2)(3), Pan RC(4), Hsu CF(1), Sung SF(5)(6).
ABSTRACT
PURPOSE: Taiwan's national health insurance (NHI) database is a valuable resource for large-scale epidemiological and long-term survival research for out-of-hospital cardiac arrest (OHCA). We developed and validated case definition algorithms for OHCA based on the International Classification of Diseases (ICD) diagnostic codes and billing codes for NHI reimbursement. PATIENTS AND METHODS: Claims data and medical records of all emergency department visits from 2010 to 2020 were retrieved from the hospital's research-based database. Death-related diagnostic codes and keywords were used to identify potential OHCA cases, which were ascertained by chart reviews. We tested the performance of the developed OHCA algorithms and validated them on an external dataset. RESULTS: The algorithm defining OHCA as any cardiac arrest (CA)-related ICD code in the first three diagnosis fields performed the best with a sensitivity of 89.5% (95% confidence interval [CI], 88.2-90.7%), a positive predictive value (PPV) of 90.6% (95% CI, 89.4-91.8%), and a kappa value of 0.900 (95% CI, 0.891-0.909). The second-best algorithm consists of any CA-related ICD code in any diagnosis field with a billing code for triage acuity level 1, achieving a sensitivity of 85.6% (95% CI, 84.1-87.0%), a PPV of 93.6% (95% CI, 92.5-94.5), and a kappa value of 0.894 (95% CI, 0.884-0.903). Both algorithms performed well in external validation. In subgroup analyses, the former algorithm performed the best in adult patients, outpatient claims, and during the ICD-9 era. The latter algorithm performed the best in the inpatient claims and during the ICD-10 era. The best algorithm for identifying pediatric OHCAs was any CA-related ICD code in the first three diagnosis fields with a billing code for triage acuity level 1. CONCLUSION: Our results may serve as a reference for future OHCA studies using the Taiwan NHI database.

7. BMC Nurs. 2022 Jun 6;21(1):141. doi: 10.1186/s12912-022-00923-0.
Basic life support knowledge in a war-torn country: a survey of nurses in Yemen.
Alkubati SA(1)(2), McClean C(3), Yu R(3), Albagawi B(4), Alsaqri SH(4), Alsabri M(5)(6).
ABSTRACT
BACKGROUND: Successful implementation of Basic life support (BLS) is critical to improving survival rates and outcomes, especially among healthcare workers. To our knowledge, there is no available literature pertaining to the level of BLS knowledge of health care professionals in Yemen. METHODS: Data was collected for this cross-sectional descriptive study from June to August 2020, using a 10-item questionnaire related to cardiopulmonary resuscitation (CPR) and BLS, along with questions on

socio-demographic characteristics. Participants were nurses in public and private hospitals located in Al-Rahida and Al-dimna cities, Taiz governance and Hodeidah city, Hodeidah governance in Yemen. RESULTS: Out of 220 distributed questionnaires, 200 were returned with a response rate of 90.9%. More than a half (53.65%) of answer choices for BLS knowledge were correct. There was a significant difference in knowledge score based on level of education where those who had Bachelor degree had more knowledge (P = 0.000). Those who said they had received training in CPR or received information about CPR had significantly higher scores than those who did not receive (P = 0.000). CONCLUSIONS: BLS knowledge among nurses in Yemen is below an acceptable level to ensure maximum survival in the event of cardiac arrest. Disseminating BLS information and training in a cost effective and efficient manner will provide a large benefit in terms of lives saved with minimal costs.

8. BMC Emerg Med. 2022 Jun 3;22(1):93. doi: 10.1186/s12873-022-00652-2.
Out of hospital cardiac arrest: experience of a bystander CPR training program in Karachi, Pakistan.
Khan UR(1), Khudadad U(2), Baig N(2), Ahmed F(2), Raheem A(2), Hisam B(3), Khan NU(2), Hock MOE(4), Razzak JA(5)(6).
ABSTRACT
BACKGROUND: Nearly 90% of out-of-hospital cardiac arrest (OHCA) patients are witnessed, yet only 2.3% received bystander cardiopulmonary resuscitation (CPR) in Pakistan. This study aimed to determine retention of knowledge and skills of Hands-Only CPR among community participants in early recognition of OHCA and initiation of CPR in Karachi, Pakistan. METHODS: Pre and post-tests were conducted among CPR training participants from diverse non-health-related backgrounds from July 2018 to October 2019. Participants were tested for knowledge and skills of CPR before training (pre-test), immediately after training (post-test), and 6 months after training (re-test). All the participants received CPR training through video and scenario-based demonstration using manikins. Post-training CPR skills of the participants were assessed using a pre-defined performance checklist. The facilitator read out numerous case scenarios to the participants, such as drowning, poisoning, and road traffic injuries, etc., and then asked them to perform the critical steps of CPR identified in the scenario on manikins. The primary outcome was the mean difference in the knowledge score and skills of the participants related to the recognition of OHCA and initiation of CPR. RESULTS: The pre and post-tests were completed by 652 participants, whereas the retention test after 6 months was completed by 322 participants. The mean knowledge score related to the recognition of OHCA, and initiation of CPR improved significantly ($p < 0.001$) from pre-test [47.8/100, Standard Deviation (SD) ±13.4] to post-test (70.2/100, SD ±12.1). Mean CPR knowledge after 6 months (retention) reduced slightly from (70.2/100, ±12.1) to (66.5/100, ±10.8). CPR skill retention for various components (check for scene safety, check for response, check for breathing and correct placement of the heel of hands) deteriorated significantly ($p < 0.001$) from 77.9% in the post-test to 72.8% in re-test. Participants performed slightly better on achieving an adequate rate of chest compressions from 73.1% in post-test to 76.7% in re-test (p 0.27). CONCLUSION: Community members with non-health backgrounds can learn and retain CPR skills, allowing them to be effective bystander CPR providers in OHCA situations. We recommend mass population training in Pakistan for CPR to increase survival from OHCA.

9. Resuscitation. 2022 Jun 8:S0300-9572(22)00174-5. doi: 10.1016/j.resuscitation.2022.06.004. Online ahead of print.
Don't call it "massage"! The importance of words during dispatcher-assisted cardiopulmonary resuscitation.
Imbriaco G(1), Masina J(2), Scquizzato T(3), Gamberini L(4), Semeraro F(5).

NO ABSTRACT AVAILABLE

10. BMC Med Educ. 2022 Jun 6;22(1):434. doi: 10.1186/s12909-022-03506-4.
Influence of pretesting and a near peer sharing real life experiences on CPR training outcomes in first year medical students: a non-randomized quasi-experimental study.
Souza AD(1), Punja D(2), Prabhath S(1), Pandey AK(3).
ABSTRACT
BACKGROUND: Existing literature on cardiopulmonary resuscitation (CPR) training focuses on the knowledge and skill components while the attitudinal component is rarely addressed. There is a need to explore how peer interaction, learning atmosphere, and communication influence learning effectiveness during CPR training. Therefore, this study's objective was to evaluate how a senior student (near peer) sharing their real-life experience of performing CPR would influence medical students' learning and readiness to perform CPR. METHODS: The present study involved 250 newly enrolled undergraduate medical students. The Solomon's four-group study design was used to evaluate the influence of both pretesting and peer interaction. Students belonging to two groups initially completed a pre-training knowledge test (pretest) and a questionnaire on readiness to perform CPR. Students from all four groups then participated in instructor-led hands-on skills training, after which the two intervention groups interacted with their senior, who shared their life experiences of performing CPR. Finally, all four groups underwent skills evaluation, immediate and delayed post-tests, and completed a questionnaire to assess readiness to perform CPR. The students also provided their feedback on the experience of interacting with a peer during the training. RESULTS: Post-test scores were significantly higher than pretest scores (Kruskal-Wallis test, $p < 0.05$). Scores were significantly higher in pretested intervention groups than in the non-pretested non-intervention group ($p < 0.05$). Delayed post-test scores were slightly but not significantly lower than the immediate post-test scores with no significant difference observed in the scores among the groups. The pretested groups showed more readiness to perform CPR and the pretested intervention group were least concerned about acquiring infection during CPR. Students in all groups were confident of performing chest compressions correctly, and found it inspiring and motivating listening to and discussing real-life experiences with a near peer. CONCLUSIONS: Hearing from peers about real-life CPR experience during CPR training sessions significantly impacted learning, enhanced student motivation to learn and may be an effective strategy to consider in routine CPR training. However, the positive effects of pretesting and peer interaction on knowledge were not sustained, highlighting a need for repeat training.

11. Am J Emerg Med. 2022 Jul;57:169. doi: 10.1016/j.ajem.2021.12.001. Epub 2021 Dec 6.
Association of the duration of on-scene advanced life support with good neurological recovery in out-of-hospital cardiac arrest: Do not miss on-scene care impact.
Jouffroy R(1), Vivien B(2).
NO ABSTRACT AVAILABLE

POST-CARDIAC ARREST TREATMENTS

1. Evid Based Complement Alternat Med. 2022 May 26;2022:1787312. doi: 10.1155/2022/1787312. eCollection 2022.
Study on the Effects of Optimized Emergency Nursing Combined with Mild Hypothermia Nursing on Neurological Prognosis, Hemodynamics, and Cytokines in Patients with Cardiac Arrest.
Wang X(1), Wu C(2).
ABSTRACT

PURPOSE: To study the effects of optimized emergency nursing combined with mild hypothermia nursing on neurological prognosis, hemodynamics, and cytokines in patients with cardiac arrest (CA). METHODS: The medical records of 147 patients who were successfully rescued by cardiopulmonary resuscitation (CPR) after CA in our hospital were retrospectively analyzed. The 56 patients admitted in 2020 who received optimized emergency nursing were recorded as the control group; and the 91 patients admitted in 2021 who received optimized emergency nursing combined with mild hypothermia nursing were recorded as the study group. The brain function of the two groups at 72 h after return of spontaneous circulation (ROSC) was analyzed: cerebral performance category (CPC) assessment method. The neurological function of the two groups before nursing and 7, 30, and 90 d after nursing was analyzed: National Institutes of Health Stroke Scale (NISHH) score. The vital signs of the two groups after 24 h of nursing were analyzed: heart rate, spontaneous breathing rate, and blood oxygen saturation. The hemodynamic indexes of the two groups at 24 hours after nursing were analyzed: mean arterial pressure (MAP), central venous pressure (CVP), systolic blood pressure (SBP), and diastolic blood pressure (DBP). The levels of cytokines of the two groups before nursing and 7 days after nursing were analyzed: tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), and interleukin-8 (IL-8). The incidence of complications and the incidence of postresuscitation syndrome (PRS) during the nursing period were compared between the two groups. RESULTS: 72 h after ROSC, the CPC results in the study group were slightly better than those in the control group, but there was no significant difference in the number of cases of CPC Grade 1, CPC Grade 2, CPC Grade 3, CPC Grade 4, and CPC Grade 5 between the two groups ($P > 0.05$). Before nursing, there was no statistical difference in the NISHH total score between the two groups ($P > 0.05$). 7, 30, and 90 d after nursing, the NISHH total score between the two groups were lower than those before nursing, and the study group's score was lower than the control group's ($P < 0.05$). 24 h after nursing, the heart rate and spontaneous breathing rate of the study group were lower than those of the control group ($P < 0.05$), and there was no significant difference in blood oxygen saturation between the two groups ($P > 0.05$). 24 h after nursing, there was no significant difference in MAP, CVP, SBP, and DBP between the two groups ($P > 0.05$). Before nursing, there was no significant difference in the levels of TNF-α, IL-6, and IL-8 between the two groups ($P > 0.05$). 7 d after nursing, the levels of TNF-α, IL-6, and IL-8 between the two groups were lower than those before nursing, and the levels of the study group were lower than those of the control group ($P < 0.05$). During the nursing period, the total complication rates of the control group and the study group were 55.36% and 34.07%, respectively, with statistical difference ($P < 0.05$). During the nursing period, the incidences of PRS in the control group and the study group were 12.50% and 3.30%, respectively, with significant difference ($P < 0.05$). CONCLUSION: The application of optimized emergency nursing combined with mild hypothermia nursing in CA can effectively improve the neurological prognosis and inflammatory levels of patients and reduce the incidence of body complications and PRS.

2. JAMA Cardiol. 2022 Jun 8. doi: 10.1001/jamacardio.2022.1416. Online ahead of print.
Emergency vs Delayed Coronary Angiogram in Survivors of Out-of-Hospital Cardiac Arrest: Results of the Randomized, Multicentric EMERGE Trial.
Hauw-Berlemont C(1), Lamhaut L(2)(3)(4), Diehl JL(1)(5), Andreotti C(6), Varenne O(7), Leroux P(8), Lascarrou JB(9), Guerin P(10), Loeb T(11), Roupie E(12), Daubin C(13), Beygui F(14), Boissier F(15), Marjanovic N(16), Christiaens L(17), Vilfaillot A(18), Glippa S(18), Prat JD(18), Chatellier G(18), Cariou A(19), Spaulding C(20); EMERGE Investigators.
ABSTRACT
IMPORTANCE: Although an emergency coronary angiogram (CAG) is recommended for patients who experience an out-of-hospital cardiac arrest (OHCA) with ST-segment elevation on the post-resuscitation electrocardiogram (ECG), this strategy is still debated in patients without ST-segment elevation. OBJECTIVE: To assess the 180-day survival rate with Cerebral Performance Category (CPC) 1 or 2 of patients who experience an OHCA without ST-segment elevation on ECG and undergo

emergency CAG vs delayed CAG. DESIGN, SETTING, AND PARTICIPANTS: The Emergency vs Delayed Coronary Angiogram in Survivors of Out-of-Hospital Cardiac Arrest (EMERGE) trial randomly assigned survivors of an OHCA without ST-segment elevation on ECG to either emergency or delayed (48 to 96 hours) CAG in 22 French centers. The trial took place from January 19, 2017, to November 23, 2020. Data were analyzed from November 24, 2020, to July 30, 2021. MAIN OUTCOMES AND MEASURES: The primary outcome was the 180-day survival rate with CPC of 2 or less. The secondary end points were occurrence of shock, ventricular tachycardia, and/or fibrillation within 48 hours, change in left ventricular ejection fraction between baseline and 180 days, CPC scale at intensive care unit discharge and day 90, survival rate, and hospital length of stay. RESULTS: A total of 279 patients (mean [SD] age, 64.7 [14.6] years; 195 men [69.9%]) were enrolled, with 141 (50.5%) in the emergency CAG group and 138 (49.5%) in the delayed CAG group. The study was underpowered. The mean (SD) time delay between randomization and CAG was 0.6 (3.7) hours in the emergency CAG group and 55.1 (37.2) hours in the delayed CAG group. The 180-day survival rates among patients with a CPC of 2 or less were 34.1% (47 of 141) in the emergency CAG group and 30.7% (42 of 138) in the delayed CAG group (hazard ratio [HR], 0.87; 95% CI, 0.65-1.15; P = .32). There was no difference in the overall survival rate at 180 days (emergency CAG, 36.2% [51 of 141] vs delayed CAG, 33.3% [46 of 138]; HR, 0.86; 95% CI, 0.64-1.15; P = .31) and in secondary outcomes between the 2 groups. CONCLUSIONS AND RELEVANCE: In this randomized clinical trial, for patients who experience an OHCA without ST-segment elevation on ECG, a strategy of emergency CAG was not better than a strategy of delayed CAG with respect to 180-day survival rate and minimal neurologic sequelae.

3. Curr Probl Cardiol. 2022 Jun 3:101276. doi: 10.1016/j.cpcardiol.2022.101276. Online ahead of print.

Utilization of Non-Gated Chest Computed Tomography Scans in Predicting Acute Coronary Occlusion in Out-of-Hospital Cardiac Arrest.

Jabri A(1), Alhuneafat L(2), Raeisi-Giglou P(3), Nabeel Y(3), Hamade H(3), Kumar A(4), Baughman W(5), Glaab J(5), Aneja A(3).

ABSTRACT

INTRODUCTION: Coronary artery disease is thought to be responsible for up to 60-80% of out-of-hospital cardiac arrests. The utility of Computed Tomography (CT) chest when it comes to identifying acute coronary occlusion in patients following an arrest has not been studied. We aim to we evaluate whether myocardial perfusion on a contrast-enhanced chest CT performed for a non-cardiac cause can predict culprit coronary occlusion as the cause of cardiac arrest, and if the absence of a perfusion defect can exclude an ischemic etiology. METHODS: A retrospective cohort of 53 consecutive patients presenting with VT or VF arrest and successful resuscitation who had contrast chest CT before angiography. CT scans were reviewed for myocardial perfusion defects by a cardiologist and radiologist blinded to angiogram findings. CT results were then compared with angiograms. RESULTS: On coronary angiography, 22(42%) of the patients presenting with out-of-hospital arrest had critical stenosis. Sensitivity and specificity of perfusion defect on CT in identifying critical stenosis on catheterization was 0.45, 95% CI [0.24, 0.68] and 0.77, 95% CI [59%, 90%], respectively. The positive likelihood ratio being 2.01 (0.91,4.46) and the negative likelihood ratio being 0.70 (0.46,1.08). The diagnostic accuracy was 64.2%. CONCLUSIONS: Our study did not show much utility for the use of myocardial perfusion defect on an incidental pre-angiography contrast chest CT to predict acute thrombotic occlusion in out-of-hospital cardiac arrest patients. However, this shouldn't discourage further studies evaluating the utility of contrast-enhanced CT-images in predicting acute coronary occlusion.

4. Int J Cardiol. 2022 Jun 2:S0167-5273(22)00824-5. doi: 10.1016/j.ijcard.2022.06.006. Online ahead of print.

Impact of emergent coronary angiography after out-of-the-hospital cardiac arrest without ST-segment elevation - a systematic review and meta-analysis.

Alves N(1), Mota M(2), Cunha M(3), Ribeiro JM(4).

ABSTRACT

INTRODUCTION: Coronary artery disease is a leading cause of out-of-the-hospital cardiac arrest (OHCA). However, there is no consensus on whether OHCA patients without ST-segment elevation (STE) benefit from emergent (ie < 2 h) coronary angiography (CAG). Our aim was to assess the impact of emergent CAG in no-STE OHCA patients. METHODS: We performed a systematic review and meta-analysis by searching the MEDLINE, Cochrane, Scopus, CINAHL and JBI databases for randomized controlled trials (RCTs) comparing emergent CAG versus standard of care (ie CAG >2 h after OHCA or not performed) in no-STE OHCA patients of presumed cardiac aetiology. The primary outcome was short term survival. Secondary outcomes included survival with good neurological outcome, mid-term survival, left ventricle ejection fraction (LVEF), acute kidney injury (AKI) and renal replacement therapy (RRT), ventricular arrhythmias and major bleeding during hospital stay. RESULTS: Seven RCTs met the inclusion and exclusion criteria and were included; one was included only in the analysis of mid-term survival and another in the LVEF analysis. Five studies (1278 patients, 643 with early CAG and 635 with no early CAG) were included in the analysis of the primary endpoint. The groups were balanced for all baseline characteristics but previous PCI, which was more frequent in the standard of care groups. There were no significant differences between groups for short-term survival (57 vs 61%; OR0.85, 95% CI0.68-1.07; I2 = 0%). There were also no differences for any of the secondary endpoints. CONCLUSION: Routine emergent CAG did not improve survival in comatose survivors of OHCA with shockable rhythm and no-STE.

TARGETED TEMPERATURE MANAGEMENT

1. Ther Hypothermia Temp Manag. 2022 Jun;12(2):82-89. doi: 10.1089/ther.2021.0012. Epub 2021 Aug 10.

MR-proANP and NT-proBNP During Targeted Temperature Management Following Out-of-Hospital Cardiac Arrest: A Post hoc Analysis of the TTH48 Trial.

Bach HM(1), Duez CHV(2), Jeppesen AN(3), Strand K(4), Søreide E(5), Kirkegaard H(6), Grejs AM(7).

ABSTRACT

We aimed to evaluate the effect of prolonged targeted temperature management (TTM) in patients with out-of-hospital cardiac arrest (OHCA) on the levels of midregional pro-atrial natriuretic peptide (MR-proANP) and N-terminal pro b-type natriuretic peptide (NT-proBNP) and assess their potential as prognostic biomarkers. A preplanned post hoc analysis of "Targeted temperature management for 48 h vs 24 h and neurologic outcome after out-of-hospital cardiac arrest: A randomized clinical trial (TTH48 trial)," where patients were randomized to TTM at 33°C ± 1°C of standard duration (24 hours) versus prolonged (48 hours). Blood samples were drawn from patients with OHCA at two Scandinavian university hospitals at admission to the ICU and at 24, 48, and 72 hours after reaching the target temperature. Primary outcome was levels of MR-proANP and NT-proBNP. Secondary outcome was cerebral performance category (CPC 1-5) at 6 months. Samples from 114 patients were analyzed. Prolonged TTM significantly decreased the levels of MR-proANP and NT-proBNP at 48 hours compared with standard 24 hours-TTM ($p < 0.01$). However, there were no significant differences at other time points. Patients with poor outcome (CPC 3-5) had a statistically significantly increased MR-proANP level at 24 hours ($p < 0.01$) and 72 hours ($p < 0.01$) compared with the good outcome group (CPC 1-2). Prognostic performance was best at 24 hours for both MR-proANP and NT-proBNP; with an AUC of 0.73 (confidence interval [95% CI]: 0.63-0.83) and 0.72 (95 % CI: 0.59-0.85), respectively. Prolonged TTM lowered the levels of both MR-proANP and NT-proBNP at 48 hours. MR-proANP may add prognostic information in postcardiac arrest patients.

2. Acta Cardiol Sin. 2022 May;38(3):391-399. doi: 10.6515/ACS.202205_38(3).20211220A.

Protocolized Post-Cardiac Arrest Care with Targeted Temperature Management.

Chen WT(1), Tsai MS(1), Huang CH(1), Chang WT(1), Chen WJ(1)(2).

ABSTRACT

Improvements in teamwork and resuscitation science have considerably increased the success rate of cardiopulmonary resuscitation. Cerebral injury, myocardial dysfunction, systemic ischemia and reperfusion response, and precipitating pathology after the return of spontaneous circulation (ROSC) constitute post-cardiac arrest syndrome. Because the entire body is involved in cardiac arrest and the early post-arrest period, protocolized post-arrest care consisting of cardiovascular optimization, ventilation and oxygenation adjustment, coronary revascularization, targeted temperature management (TTM), and control of seizures and blood sugar would benefit survival and neurological outcomes. Emergent coronary angiography is suggested for cardiac arrest survivors suspected of having ST-elevation myocardial infarction, however the superiority of culprit or complete revascularization in patients with multivessel coronary lesions remains undetermined. High-quality TTM should be considered for comatose patients who are successfully resuscitated from cardiac arrest, however the optimal target temperature may depend on the severity of their condition. The optimal timing for making prognostication should be no earlier than 72 h after rewarming in TTM patients, and 72 h following ROSC in non-TTM patients. To predict neurological recovery correctly may need the use of several prognostic tools together, including clinical neurological examinations, brain images, neurological studies and biomarkers.

3. Ther Hypothermia Temp Manag. 2022 Jun;12(2):74-81. doi: 10.1089/ther.2021.0011. Epub 2021 Jul 16.

Water Temperature Variability Is Associated with Neurologic Outcomes in Out-of-Hospital Cardiac Arrest Survivors Who Underwent Targeted Temperature Management at 33°C.

Ryu SJ(1), Lee DH(1), Lee BK(1), Jeung KW(1), Jung YH(1), Park JS(2)(3), Min JH(2), Kim DK(1).

ABSTRACT

We examined the association between variability in body temperature (BT) and water temperature (WT) during the maintenance period of targeted temperature management (TTM) and neurologic outcomes in out-of-hospital cardiac arrest (OHCA) survivors. Adult (≥18 years), comatose OHCA survivors who underwent TTM at 33°C between October 2015 and December 2019 were included. We collected data on BT and WT recorded every minute during the TTM maintenance period. Temperature variability was measured as the standard deviation of BT and WT during the 33°C maintenance period. The primary outcome was a poor neurologic outcome, defined as a cerebral performance category scale 3-5 at 6 months. Of the 154 included patients, 96 (62.3%) had poor outcomes. The BT variability in the poor outcome group was lower than that in the good outcome group (0.16°C [0.13-0.27°C] vs. 0.13°C [0.11-0.18°C]). In addition, the WT variability during the maintenance period in the poor outcome group was lower than that in the good outcome group (2.24°C [1.80-3.96°C] vs. 1.77°C [1.26-2.32°C]). In the multivariate analysis, WT variability (odds ratio 0.508; 95% confidence interval, 0.295-0.874; p = 0.014) was independently associated with poor neurologic outcome. BT variability and cooling beyond 33.0°C ± 1.0°C were not associated with poor neurologic outcomes. WT variability during the maintenance period was independently associated with neurologic outcomes in OHCA survivors who underwent TTM at 33°C. In addition, overcooling or undercooling during the maintenance period was not associated with neurologic outcomes.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. J Emerg Med. 2022 May;62(5):648-656. doi: 10.1016/j.jemermed.2021.10.032. Epub 2022 Jan 20.
A Multicenter, Prospective Study Comparing Subxiphoid and Parasternal Views During Brief Echocardiography: Effect on Image Quality, Acquisition Time, and Visualized Anatomy.
Gaspari RJ(1), Gleeson T(2), Alerhand S(3), Caputo W(4), Damewood S(5), Dicroce C(2), Dwyer K(6), Gibbons R(7), Greenstein J(4), Harvey J(2), Hill M(2), Hoffmann B(8), Jordan MK(9), Karfunkle B(10), Kropf C(11), Lindsay R(2), Luo S(12), Lusiak M(13), Nalbandian A(2), Naraghi L(14), Nelson B(15), Nickels LC(16), Nolting L(17), Nordberg A(2), Panicker A(18), Pare J(19), Peach M(20), Pinto D(21), Graham P(2), Rose G(22), Russell F(23), Schafer J(8), Scheatzle M(24), Schnittke N(25), Shpilko M(26), Soucy Z(27), Stowell JR(28), Vryhof D(29), Gottlieb M(30).
ABSTRACT
BACKGROUND: Recent literature has suggested echocardiography (echo) may prolong pauses in chest compressions during cardiac arrest. OBJECTVES: We sought to determine the impact of the sonographic approach (subxiphoid [SX] vs. parasternal long [PSL]) on time to image completion, image quality, and visualization of cardiac anatomy during echo, as performed during Advanced Cardiac Life Support. METHODS: This was a multicenter, randomized controlled trial conducted at 29 emergency departments (EDs) assessing the time to image acquisition and image quality between SX and PSL views for echo. Patients were enrolled in the ED and imaged in a simulated cardiac arrest scenario. Clinicians experienced in echo performed both SX and PSL views, first view in random order. Image quality and time to image acquisition were recorded. Echos were evaluated for identification of cardiac landmarks. Data are presented as percentages or medians with interquartile ranges (IQRs). RESULTS: We obtained 6247 echo images, comprising 3124 SX views and 3123 PSL. Overall time to image acquisition was 9.0 s (IQR 6.7-14.1 s). Image acquisition was shorter using PSL (8.8 s, IQR 6.5-13.5 s) compared with SX (9.3 s, IQR 6.7-15.0 s). The image quality was better with the PSL view (3.86 vs. 3.54; $p < 0.0001$), twice as many SX images scoring in the worst quality category compared with PSL (8.6% vs. 3.7%). Imaging of the pericardium, cardiac chambers, and other anatomic landmarks was superior with PSL imaging. CONCLUSIONS: Echo was performed in < 10 s in > 50% of patients using either imaging technique. Imaging using PSL demonstrated improved image quality and improved identification of cardiac landmarks.

2. Eur Heart J Acute Cardiovasc Care. 2022 Jun 10:zuac071. doi: 10.1093/ehjacc/zuac071. Online ahead of print.
Percutaneous coronary intervention and the need for an implantable cardioverter-defibrillator after out-of-hospital cardiac arrest.
Auer J(1)(2)(3), Lamm G(4).
NO ABSTRACT AVAILABLE

3. Crit Care Med. 2022 Jun 9. doi: 10.1097/CCM.0000000000005594. Online ahead of print.
Accuracy of the Initial Rhythm to Predict a Short No-Flow Time in Out-of-Hospital Cardiac Arrest.
Cournoyer A(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16)(17)(18), Cavayas YA(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16)(17)(18), Potter B(6)(9)(10), Lamarche Y(2), Segal E(5)(16)(17), de Montigny L(5), Albert M(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16) (17)(18), Lessard J(1)(3), Marquis M(2), Paquet J(2), Cossette S(13)(18), Morris J(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16)(17)(18), Castonguay V(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16)(17)(18), Chauny JM (1)(2)(3)(4) (5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16)(17)(18), Daoust R(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13) (14)(15)(16)(17)(18).
ABSTRACT

OBJECTIVES: The no-flow time (NFT) can help establish prognosis in out-of-hospital cardiac arrest (OHCA) patients. It is often used as a selection criterion for extracorporeal resuscitation. In patients with an unwitnessed OHCA for whom the NFT is unknown, the initial rhythm has been proposed to identify those more likely to have had a short NFT. Our objective was to determine the predictive accuracy of an initial shockable rhythm for an NFT of 5 minutes or less (NFT ≤ 5). DESIGN: Retrospective analysis of prospectively collected data. SETTING: Prehospital OHCA in eight U.S. and three Canadian sites. PATIENTS: A total of 28,139 adult patients with a witnessed nontraumatic OHCA were included, of whom 11,228 (39.9%) experienced an emergency medical service-witnessed OHCA (NFT = 0), 695 (2.7%) had a bystander-witnessed OHCA, and an NFT less than or equal to 5, and 16,216 (57.6%) with a bystander-witnessed OHCA and an NFT greater than 5. INTERVENTIONS: Sensitivity, specificity, and likelihood ratios of an initial shockable rhythm to identify patients with an NFT less than or equal to 5 minutes. MEASUREMENTS AND MAIN RESULTS: The sensitivity of an initial shockable rhythm to identify patients with an NFT less than or equal to 5 was poor (25% [95% CI, 25-26]), but specificity was moderate (70% [95% CI, 69-71]). The positive and likelihood ratios were inverted (negative accuracy) (positive likelihood ratio, 0.76 [95% CI, 0.74-0.79]; negative likelihood ratio, 1.12 [95% CI, 1.10-1.12]). Including only patients with a bystander-witnessed OHCA improved the sensitivity to 48% (95% CI, 45-52), the positive likelihood ratio to 1.45 (95% CI, 1.33-1.58), and the negative likelihood ratio to 0.77 (95% CI, 0.72-0.83), while slightly lowering the specificity to 67% (95% CI, 66-67). CONCLUSIONS: Our analysis demonstrated that the presence of a shockable rhythm at the time of initial assessment was poorly sensitive and only moderately specific for OHCA patients with a short NFT. The initial rhythm, therefore, should not be used as a surrogate for NFT in clinical decision-making.

4. Resuscitation. 2022 Jun 2:S0300-9572(22)00170-8. doi: 10.1016/j.resuscitation.2022.05.019. Online ahead of print.

A method for continuous rhythm classification and early detection of ventricular fibrillation during CPR.

Kwok H(1), Coult J(2), Blackwood J(3), Sotoodehnia N(4), Kudenchuk P(5), Rea T(6).

ABSTRACT

AIM: We developed a method which continuously classifies the ECG rhythm during CPR in order to guide clinical care. METHODS: We conducted a retrospective study of 432 patients treated following out-of-hospital cardiac arrest. Continuous ECG sequences from two-minute CPR cycles were extracted from defibrillator recordings and further divided into five-second clips. We developed an algorithm using wavelet analysis, hidden semi-Markov modeling, and random forest classification. The algorithm classifies individual clips as asystole, organized rhythm, ventricular fibrillation, or Inconclusive, while integrating information from previous clips. Classifications were compared to manual annotations to estimate accuracy in an independent validation dataset. Continuous sequences were classified as shockable, non-shockable, or Inconclusive; classifications were used to compute shock sensitivity and specificity. RESULTS: Of 432 patient-cases, 290 were used for development and 142 for validation. In the 12,294 validation ECG clips during CPR, accuracies were 0.88 (95% CI 0.85-0.91) for asystole, 0.98 (95% CI 0.98-0.99) for organized rhythm, and 0.97 (95% CI 0.96-0.97) for ventricular fibrillation, with 43% classified as Inconclusive. Of 457 continuous sequences, shock sensitivity was 0.90 (95% CI 0.86, 0.93), shock specificity was 0.98 (95% CI 0.93, 0.99), and 7% were Inconclusive. Median delay to ventricular fibrillation recognition was 10 (IQR 5, 32) seconds. CONCLUSION: An automated algorithm continuously classified the primary resuscitation rhythms-asystole, organized rhythms, and ventricular fibrillation-with 88-98% accuracy, enabling accurate shock advisory guidance during most two-minute CPR cycles. Additional

investigation is required to understand how algorithm implementation could affect rescuer actions and clinical outcomes.

PEDIATRICS AND CHILDREN

1. Pediatr Crit Care Med. 2022 Jun 9. doi: 10.1097/PCC.0000000000003012. Online ahead of print.
Weight-Based Versus Flat Dosing of Epinephrine During Cardiac Arrest in the PICU: A Multicenter Survey.
Kienzle MF(1), Morgan RW(1), Dewan M(2), Hebbar KB(3), Nadkarni VM(1), Srinivasan V(1), Tegtmeyer K(2), Sutton RM(1), Wolfe HA(1).

ABSTRACT
OBJECTIVES: Pediatric Advanced Life Support (PALS) guidelines include weight-based epinephrine dosing recommendations of 0.01 mg/kg with a maximum of 1 mg, which corresponds to a weight of 100 kg. Actual practice patterns are unknown. DESIGN: Multicenter cross-sectional survey regarding institutional practices for the transition from weight-based to flat dosing of epinephrine during cardiopulmonary resuscitation in PICUs. Exploratory analyses compared epinephrine dosing practices with several institutional characteristics using Fisher exact test. SETTING: Internet-based survey. SUBJECTS: U.S. PICU representatives (one per institution) involved in resuscitation systems of care. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Of 137 institutions surveyed, 68 (50%) responded. Most responding institutions are freestanding children's hospitals or dedicated children's hospitals within combined adult/pediatric hospitals (67; 99%); 55 (81%) are academic and 41 (60%) have PICU fellowship programs. Among respondents, institutional roles include PICU medical director (13; 19%), resuscitation committee member (23; 34%), and attending physician with interest in resuscitation (21; 31%). When choosing between weight-based and flat dosing, 64 respondents (94%) report using patient weight, 23 (34%) patient age, and five (7%) patient pubertal stage. Among those reporting using weight, 28 (44%) switch at 50 to less than 60 kg, 17 (27%) at 60 to less than 80 kg, five (8%) at 80 to less than 100 kg, and eight (12%) at greater than or equal to 100 kg. Among those reporting using age, four (17%) switch at 14 to less than 16 years, five (22%) at 16 to less than 18, and six (26%) at greater than or equal to 18. Twenty-nine respondents (43%) report using ideal body weight when dosing epinephrine in obese patients. Using patient age in choosing epinephrine dosing is more common in institutions that require Advanced Cardiac Life Support (ACLS) certification for some/all code team responders compared with institutions that do not require ACLS certification (52% vs 22%; p = 0.02). CONCLUSIONS: The majority of PICUs surveyed report epinephrine dosing practices that are inconsistent with PALS guidelines.

2. Resusc Plus. 2022 May 28;10:100253. doi: 10.1016/j.resplu.2022.100253. eCollection 2022 Jun.
Paediatric defibrillation and the role of the layperson - Is it all in the voice?
Haskins B(1), Bray JE(2)(3).
NO ABSTRACT AVAILABLE

EXTRACORPOREAL LIFE SUPPORT

1. Catheter Cardiovasc Interv. 2022 Jun 10. doi: 10.1002/ccd.30295. Online ahead of print.
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.

2. Am J Emerg Med. 2022 Jul;57:181. doi: 10.1016/j.ajem.2021.12.042. Epub 2021 Dec 29.
ECPR and out of hospital cardiac arrest.
Downing J(1), Cardona S(2), Tran QK(3).
NO ABSTRACT AVAILABLE

EXPERIMENTAL RESEARCH

1. Pediatr Res. 2022 Jun 9. doi: 10.1038/s41390-022-02126-4. Online ahead of print.
Epinephrine vs placebo in neonatal resuscitation: ROSC and brain MRS/MRI in term piglets.
Andersen HB(1), Andersen M(2), Andelius TCK(2), Pedersen MV(2), Løfgren B(3)(4), Pedersen M(5), Ringgaard S(6), Kyng KJ(2), Henriksen TB(2)(4).
ABSTRACT

BACKGROUND: We aimed to investigate the effect of epinephrine vs placebo on return of spontaneous circulation (ROSC) and brain magnetic resonance spectroscopy and imaging (MRS/MRI) in newborn piglets with hypoxic cardiac arrest (CA). METHODS: Twenty-five piglets underwent hypoxia induced by endotracheal tube clamping until CA. The animals were randomized to CPR + intravenous epinephrine or CPR + placebo (normal saline). The primary outcome was ROSC, and secondary outcomes included time-to-ROSC, brain MRS/MRI, and composite endpoint of death or severe brain MRS/MRI abnormality. RESULTS: ROSC was more frequent in animals treated with epinephrine than placebo; 10/13 vs 4/12, RR = 2.31 (95% CI: 1.09-5.77). We found no difference in time-to-ROSC (120 (113-211) vs 153 (116-503) seconds, p = 0.7) or 6-h survival (7/13 vs 3/12, p = 0.2). Among survivors, there was no difference between groups in brain MRS/MRI. We found no difference in the composite endpoint of death or severe brain MRS/MRI abnormality; RR = 0.7 (95% CI: 0.37-1.19). CONCLUSIONS: Resuscitation with epinephrine compared to placebo improved ROSC frequency after hypoxic CA in newborn piglets. We found no difference in time-to-ROSC or the composite endpoint of death or severe brain MRS/MRI abnormality. IMPACT: In a newborn piglet model of hypoxic cardiac arrest, resuscitation with epinephrine compared to placebo improved the rate of return of spontaneous circulation and more than doubled the 6-h survival. Brain MRS/MRI biomarkers were used to evaluate the effect of epinephrine vs placebo. We found no difference between groups in the composite endpoint of death or severe brain MRS/MRI abnormality. This

study adds to the limited evidence regarding the effect and safety of epinephrine; the lack of high-quality evidence from randomized clinical trials was highlighted in the latest ILCOR 2020 guidelines, and newborn animal studies were specifically requested.

2. J Am Heart Assoc. 2022 Jun 7;11(11):e025400. doi: 10.1161/JAHA.122.025400. Epub 2022 May 27.
Effects of Sodium Nitroprusside Administered Via a Subdural Intracranial Catheter on the Microcirculation, Oxygenation, and Electrocortical Activity of the Cerebral Cortex in a Pig Cardiac Arrest Model.
Lee HY(1), Jung YH(2)(3), Mamadjonov N(4), Jeung KW(2)(3), Kim MC(5), Lim KS(6), Jeon CY(7), Lee Y(7), Kim HJ(8).
ABSTRACT
Background Postischemic cerebral hypoperfusion has been indicated as an important contributing factor to secondary cerebral injury after cardiac arrest. We evaluated the effects of sodium nitroprusside administered via a subdural intracranial catheter on the microcirculation, oxygenation, and electrocortical activity of the cerebral cortex in the early postresuscitation period using a pig model of cardiac arrest. Methods and Results Twenty-nine pigs were resuscitated with closed cardiopulmonary resuscitation after 14 minutes of untreated ventricular fibrillation. Thirty minutes after restoration of spontaneous circulation, 24 pigs randomly received either 4 mg of sodium nitroprusside (IT-SNP group) or saline placebo (IT-saline group) via subdural intracranial catheters and were observed for 5 hours. The same dose of sodium nitroprusside was administered intravenously in another 5 pigs. Compared with the IT-saline group, the IT-SNP group had larger areas under the curve for tissue oxygen tension and percent changes of arteriole diameter and number of perfused microvessels from baseline (all $P<0.05$) monitored on the cerebral cortex during the 5-hour period, without severe hemodynamic instability. This group also showed faster recovery of electrocortical activity measured using amplitude-integrated electroencephalography. Repeated-measures analysis of variance revealed significant group-time interactions for these parameters. Intravenously administered sodium nitroprusside caused profound hypotension but did not appear to increase the cerebral parameters. Conclusions Sodium nitroprusside administered via a subdural intracranial catheter increased post-restoration of spontaneous circulation cerebral cortical microcirculation and oxygenation and hastened electrocortical activity recovery in a pig model of cardiac arrest. Further studies are required to determine its impact on the long-term neurologic outcomes.

CASE REPORTS

1. Int J Surg Case Rep. 2022 May 11;95:107181. doi: 10.1016/j.ijscr.2022.107181. Online ahead of print.
Cardiopulmonary resuscitation after video-assisted thoracoscopic surgery with subtotal thyroidectomy: Case report.
Shen W(1), Huang J(2).
ABSTRACT
INTRODUCTION AND IMPORTANCE: Postoperative complication of thoracic surgery often consists of bleeding, pneumothorax, pulmonary atelectasis, infection, etc.; however, concomitant diseases such as thyroid hormone disorder deserve to think about and summarized. CASE PRESENTATION: This case was reported as a rare postoperative cardiopulmonary arrested of a 46-year-woman who presented bilateral lung nodules with concomitant subtotal thyroidectomy 2 months ago with Toremifene Citrate to sustain thyroid hormones. 3D-VATS was allowed to be conducted after her

preoperative examination and blood tests. Unexpectedly, she suddenly fell in the bathroom at 5 pm the next day. Thirty minutes later, while finding cardiopulmonary arrest CPR endotracheal intubation assisted ventilation; in the meantime, that conducted vasoactive interventions for 50 min. Finally, the patient's heart rhythm recovered, and her vital sign index slowly tended to normal. CLINICAL DISCUSSION: Cardiopulmonary arrested usually occurs in massive invasive surgery, sudden severe diseases such as stroke, myocardial infarction, or pulmonary embolism. Even if certain chronic physical diseases are related, clinical symptoms usually catch the surgeon's attention. Ultimately, the excluded major inducing reasons during the medical process in ICU; by contract, it is still to discuss the thyroid hormones disorder that could not convince us to explain this postoperative cardio-pulmonary arrest. CONCLUSION: Although this cardiopulmonary resuscitation for more than 30 min and following medical treatment in ICU was undoubtedly successful, it is necessary to focus on managing concomitant thyroid hormones during surgery and think about certain physiological changes if it was one of the reasons.

2. J Cardiothorac Surg. 2022 Jun 6;17(1):142. doi: 10.1186/s13019-022-01856-0.
ECMO for paediatric cardiac arrest caused by bronchial rupture and severe lung injury: a case report about life-threatening rescue at an adult ECMO centre.
Chu X(1), Chen W(2), Wang Y(1), Zhu L(1), Zhang M(1), Zhang S(3).
ABSTRACT
BACKGROUND: Bronchial rupture in children is a rare but dangerous complication after chest trauma and is associated with increased mortality. Veno-venous (V-V) extracorporeal membrane oxygenation (ECMO) is reported as one of the treatments for this life-threatening complication. CASE PRESENTATION: A 4-year-old boy with bronchial rupture and traumatic wet lung complicated by cardiac arrest after chest trauma was admitted to an adult ECMO centre. He experienced two cardiac arrests, one before and one during the operation. The total duration of cardiac arrest was 30 min. V-V ECMO was initiated because of severe hypoxia and hypercapnia during the operation. ECMO was performed for 6 days, and mechanical ventilation lasted 11 days. On the 31st day after surgery, he had recovered completely and was discharged without neurological deficit. CONCLUSION: V-V ECMO can be considered for supportive care in children with severe acute respiratory failure after bronchial rupture. In an emergency, V-V ECMO can be carried out effectively in a qualified and experienced adult ECMO centre. However, the application of ECMO in children is different from that in adults and requires more refined management.

3. Pan Afr Med J. 2022 May 5;42:7. doi: 10.11604/pamj.2022.42.7.34446. eCollection 2022.
Hemostatic instantaneous coagulation on echocardiogram: a defining feature of the last heartbeat (a case report).
Gbadebo TD(1), Antwi-Amoabeng D(2), Abiose A(3).
ABSTRACT
There is a paucity of detailed descriptions of echocardiographic features of the dying heart in the literature. A 64-year-old man on chronic hemodialysis presented with cardiac arrest after missing dialysis for three weeks. He received resuscitation efforts but died while his last heartbeats were fortuitously recorded by echocardiography. Rapid echo image acquisition during pulse check of a cardiopulmonary resuscitation attempt provided a unique opportunity for documenting the echocardiographic features of a dying heart. There was a rapid progressive dense echogenicity first in the left ventricular chamber and subsequently in all other chambers, which coincided with the final heartbeats. There is no prior documentation of this observation in the literature. We hereby illustrate and characterize this observation we term as Hemostatic Instantaneous Coagulation on

Echo (HICE). HICE may be the defining feature of the dying heart and may guide the decision to discontinue resuscitation interventions.