This week's PubMed 7th – 13th November 2021: articles of interest n = 39

CPR AND COVID-19

1. Ann Intensive Care. 2021 Nov 13;11(1):155. doi: 10.1186/s13613-021-00945-y.
Incidence, clinical characteristics, and outcome after unexpected cardiac arrest among critically ill adults with COVID-19: insight from the multicenter prospective ACICOVID-19 registry.
Chelly J(1), Plantefève G(2), Kamel T(3), Bruel C(4), Nseir S(5), Lai C(6), Cirillo G(7), Skripkina E(8), Ehrminger S(9), Berdaguer-Ferrari FD(10), Le Marec J(11), Paul M(12), Autret A(13), Deye N(14); ACICOVID-19 study group.

ABSTRACT
BACKGROUND: Initial reports have described the poor outcome of unexpected cardiac arrest (CA) in intensive care unit (ICU) among COVID-19 patients in China and the USA. However, there are scarce data on characteristics and outcomes of such CA patients in Europe. METHODS: Prospective registry in 35 French ICUs, including all in-ICU CA in COVID-19 adult patients with cardiopulmonary resuscitation (CPR) attempt. Favorable outcome was defined as modified Rankin scale ranging from 0 to 3 at day 90 after CA. RESULTS: Among the 2425 COVID-19 patients admitted to ICU from March to June 2020, 186 (8%) experienced in-ICU CA, of whom 146/186 (78%) received CPR. Among these 146 patients, 117 (80%) had sustained return of spontaneous circulation, 102 (70%) died in the ICU, including 48 dying within the first day after CA occurrence and 21 after withdrawal of life-sustaining therapy. Most of CA were non-shockable rhythm (90%). At CA occurrence, 132 patients (90%) were mechanically ventilated, 83 (57%) received vasopressors and 75 (51%) had almost three organ failures. Thirty patients (21%) had a favorable outcome. Sepsis-related organ failure assessment score > 9 before CA occurrence was the single parameter constantly associated with unfavorable outcome in multivariate analysis. CONCLUSIONS: In-ICU CA incidence remains high among a large multicenter cohort of French critically ill adults with COVID-19. However, 21% of patients with CPR attempt remained alive at 3 months with good functional status. This contrasts with other recent reports showing poor outcome in such patients.

CPR/MECHANICAL CHEST COMPRESSION

No articles identified.

REGISTRIES, REVIEWS AND EDITORIALS

1. Circulation. 2021 Nov 12. doi: 10.1161/CIRCULATIONAHA.121.056012. Online ahead of print.
Inequalities in Income and Education are Associated with Survival Differences after Out-of-hospital Cardiac Arrest: A Nationwide Observational Study.
Jonsson M(1), Härkönen J(2), Ljungman P(3), Nordberg P(1), Ringh M(1), Hirlekar G(4), Rawshani A(5), Herlitz J(6), Ljung R(3), Hollenberg J(1).

ABSTRACT
Background: Despite the acknowledged importance of socioeconomic factors as regards cardiovascular-disease onset, and survival, the relationship between individual-level socioeconomic factors and survival after out-of-hospital cardiac arrest (OHCA) is not fully established. Our aim was to investigate whether socioeconomic variables are associated with 30-day survival after OHCA. Methods: We linked data from the Swedish Registry for Cardiopulmonary Resuscitation with

individual-level data on socioeconomic factors (i.e. educational level and disposable income) from Statistics Sweden. Confounding and mediating variables included demographic factors, comorbidity and Utstein resuscitation variables. Outcome was 30-day survival. Multiple modified Poisson regression was used for the main analyses. Results: A total of 31,373 OHCAs occurring in 2010-2017 were included. Crude 30-day survival rates by income quintiles were: Q1 (low) 414/6277 (6.6%), Q2=339/6276 (5.4%), Q3=423/6275 (6.7%), Q4=652/6273 (10.4%) and Q5 (high) 928/6272 (14.8%). In adjusted analysis, the chance of survival by income level followed a gradient-like increase, with a risk ratio (RR) of 1.86 (95% CI 1.65-2.09) in the highest-income quintile vs. the lowest. This association remained after adjusting for comorbidity, resuscitation factors and initial rhythm. A higher educational level was associated with improved 30-day survival, the RR associated with post-secondary education ≥ 4 years being 1.51 (95% CI 1.30-1.74). Survival disparities by income and educational level were observed in both men and women. Conclusions: In this nationwide observational study using individual-level socioeconomic data, higher income and higher educational level were associated with better 30-day survival following OHCA, in both sexes.

2. Clin Toxicol (Phila). 2021 Oct;59(10):877-887. doi: 10.1080/15563650.2021.1945082. Epub 2021 Aug 16.

Extracorporeal membrane oxygenation use in poisoning: a narrative review with clinical recommendations.

Upchurch C(1), Blumenberg A(2), Brodie D(3)(4), MacLaren G(5)(6), Zakhary B(7), Hendrickson RG(8).

ABSTRACT

CONTEXT: Poisoning may lead to respiratory failure, shock, cardiac arrest, or death. Extracorporeal membrane oxygenation (ECMO) may be used to provide circulatory support, termed venoarterial (VA) ECMO; or respiratory support termed venovenous (VV) ECMO. The clinical utility of ECMO in poisoned patients remains unclear and guidelines on its use in this setting are lacking. OBJECTIVES: To perform a literature search and narrative review on the use of ECMO in poisonings. Additionally, to provide recommendations on the use of ECMO in poisonings from physicians with expertise in ECMO, medical toxicology, critical care, and emergency medicine. METHODS: A literature search in Ovid MEDLINE from 1946 to October 14, 2020, was performed to identify relevant articles with a strategy utilizing both MeSH terms and adjacency searching that encompassed both extracorporeal life support/ECMO/Membrane Oxygenation concepts and chemically-induced disorders/ toxicity/ poisoning concepts, which identified 318 unique records. Twelve additional manuscripts were identified by the authors for a total of 330 articles for screening, of which 156 were included for this report. NARRATIVE LITERATURE REVIEW: The use of ECMO in poisoned patients is significantly increasing over time. Available retrospective data suggest that patients receiving VA ECMO for refractory shock or cardiac arrest due to poisoning have lower mortality as compared to those who receive VA ECMO for non-poisoning-related indications. Poisoned patients treated with ECMO have reduced mortality as compared to those treated without ECMO with similar severity of illness and after adjusted analyses, regardless of the type of ingestion. This is especially evident for poisoned patients with refractory cardiac arrest placed on VA ECMO (termed extracorporeal cardiopulmonary resuscitation [ECPR]). INDICATIONS: We suggest VA ECMO be considered for poisoned patients with refractory cardiogenic shock (continued shock with myocardial dysfunction despite fluid resuscitation, vasoactive support, and indicated toxicologic therapies such as glucagon, intravenous lipid emulsion, hyperinsulinemia euglycemia therapy, or others), and strongly considered for patients with cardiac arrest in institutions which are structured to deliver effective ECPR. VV ECMO should be considered in poisoned patients with ARDS or severe respiratory failure according to traditional indications for ECMO in this setting. CONTRAINDICATIONS: Patients with pre-existing comorbidities with low expected survival or recovery. Relative contraindications vary based on each

center's experience but often include: severe brain injury; advanced age; unrepaired aortic dissection or severe aortic regurgitation in VA ECMO; irreversible organ injury; contraindication to systemic anticoagulation, such as severe hemorrhage. CONCLUSIONS: ECMO may provide hemodynamic or respiratory support to poisoned patients while they recover from the toxic exposure and metabolize or eliminate the toxic agent. Available literature suggests a potential benefit for ECMO use in selected poisoned patients with refractory shock, cardiac arrest, or respiratory failure. Future studies may help to further our understanding of the use and complications of ECMO in poisoned patients.

IN-HOSPITAL CARDIAC ARREST

1. J Clin Med. 2021 Oct 31;10(21):5131. doi: 10.3390/jcm10215131.
Cardiac Arrest Survival Postresuscitation In-Hospital (CASPRI) Score Predicts Neurological Favorable Survival in Emergency Department Cardiac Arrest.
Tsai JC(1)(2)(3), Ma JW(2)(3)(4)(5)(6), Liu SC(7), Lin TC(2)(3)(4)(8), Hu SY(2)(3)(4)(5)(6)(9).
ABSTRACT
BACKGROUND: This study was conducted to identify the predictive factors for survival and favorable neurological outcome in patients with emergency department cardiac arrest (EDCA).
METHODS: ED patients who suffered from in-hospital cardiac arrest (IHCA) from July 2014 to June 2019 were enrolled. The electronic medical records were retrieved and data were extracted according to the IHCA Utstein-style guidelines. RESULTS: The cardiac arrest survival post-resuscitation in-hospital (CASPRI) score was associated with survival, and the CASPRI scores were lower in the survival group. Three components of the CASPRI score were associated with favorable neurological survival, and the CASPRI scores were lower in the favorable neurological survival group of patients who were successfully resuscitated. The independent predictors of survival were presence of hypotension/shock, metabolic illnesses, short resuscitation time, receiving coronary angiography, and TTM. Receiving coronary angiography and low CASPRI score independently predicted favorable neurological survival in resuscitated patients. The performance of a low CASPRI score for predicting favorable neurological survival was fair, with an AUROCC of 0.77. CONCLUSIONS: The CASPRI score can be used to predict survival and neurological status of patients with EDCA. Post-cardiac arrest care may be beneficial for IHCA, especially in patients with EDCA.

2. Resusc Plus. 2021 Nov 1;8:100178. doi: 10.1016/j.resplu.2021.100178. eCollection 2021 Dec.
In-hospital cardiac arrest due to pulmonary embolism - Treatment and outcomes in a Swedish cohort study.
Henriksson CE(1), Frithiofsson J(2), Bruchfeld S(1)(2), Bendz E(1)(2), Bruzelius M(2)(3), Djärv T(1)(2).
ABSTRACT
OBJECTIVES: Pulmonary embolism (PE) constitutes one of the reversible causes of cardiac arrest. The prognosis for PE-related cardiac arrest is poor. Some previous studies have suggested a higher survival rate in patients with PE-related cardiac arrest who receive thrombolysis. No such study has focused on in-hospital cardiac arrests (IHCA). AIM: To describe the prevalence of PE-related IHCA and the characteristics of those patients, as well as to describe favourable and adverse outcomes after thrombolysis. MATERIAL AND METHODS: All patients ≥ 18 years who experienced an IHCA at Karolinska University Hospital between 2007 and 2020 with PE as the primary cause of IHCA were included. Patients were identified from the Swedish Registry for Cardiopulmonary Resuscitation (SRCR). Data was collected from the SRCR and medical records. The primary outcome was survival to discharge. Secondary outcomes were alive at the end of CPR, major bleeding, and minor bleeding. RESULTS: Out of 2,128 IHCA patients, 64 (3%) had a PE-related IHCA of whom 16 (25%) had thrombolysis. A significant association was seen between thrombolysis and survival to discharge (44

% vs 8 %, p-value < 0.01). Major bleeding was not seen in any patient. CONCLUSION: Pulmonary embolism is an uncommon cause of IHCA, and thrombolysis is often not administered in such patients. Thrombolysis may increase survival to hospital discharge, and among the selected patients treated with thrombolysis in our study, there was no apparent major bleeding.

3. Mayo Clin Proc Innov Qual Outcomes. 2021 Oct 28;5(6):1021-1028. doi: 10.1016/j. mayocpiqo. 2021.06.002. eCollection 2021 Dec.

Association Between Hospital Resuscitation Team Leader Credentials and Survival Outcomes for In-hospital Cardiac Arrest.

Hejjaji V(1)(2), Chakrabarti AK(3), Nallamothu BK(3)(4), Iwashyna TJ(3)(4), Krein SL(3)(4), Trumpower B(3), Kennedy M(1), Chinnakondepalli K(1), Malik AO(1)(2), Chan PS(1)(2).

ABSTRACT

OBJECTIVE: To assess whether survival rates for in-hospital cardiac arrest (IHCA) vary across hospitals depending on whether resuscitations are typically led by an attending physician, a physician trainee, or a nonphysician. PATIENTS AND METHODS: In 2018, we conducted a survey of hospitals participating in the national Get with the Guidelines - Resuscitation registry for IHCA. Using responses from the question "Who typically leads codes at your institution?" we categorized hospitals on the basis of who typically leads their resuscitations: attending physician, physician trainee, or nonphysician. We then compared risk-adjusted hospital rates of return of spontaneous circulation, survival to discharge, and favorable neurological survival from 2015 to 2017 between these 3 hospital groups by using multivariable hierarchical regression. RESULTS: Overall, 193 hospitals completed the study survey, representing a total of 44,477 IHCAs (mean age, 65.0±15.5 years; 40.8% were women). Most hospitals had resuscitations led by physicians, with 121 (62.7%) led by an attending physician, 58 (30.0%) by a physician trainee, and 14 (7.3%) by a nonphysician. The risk-standardized rates of survival to discharge were similar across hospitals, regardless of whether resuscitations were typically led by an attending physician, a physician trainee, or a nonphysician (25.6%±4.8%, 25.9%±4.7%, and 25.7%±3.6%, respectively; P=.88). Similarly, there were no differences between the 3 groups in risk-adjusted rates of return of spontaneous circulation (71.7%±6.3%, 73%±6.3%, and 73.4%±6.4%; P=.30) and favorable neurological survival (21.6%±7.1%, 22.7%±6.1%, and 20.9%±6.5%; P=.50). CONCLUSION: In hospitals in a national IHCA registry, IHCA resuscitations were usually led by physicians. However, there was no association between a hospital's typical resuscitation team leader credentials and IHCA survival outcomes.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Int J Environ Res Public Health. 2021 Oct 20;18(21):11020. doi: 10.3390/ijerph182111020.

Effect of Temporal Difference on Clinical Outcomes of Patients with Out-of-Hospital Cardiac Arrest: A Retrospective Study from an Urban City of Taiwan.

Huang HC(1), Lee TY(1), Tsai CH(2)(3), Su YS(4), Chen YR(1), Yeh YN(1), Hsu CF(1), Tsai MJ(1).

ABSTRACT

Circadian pattern influence on the incidence of out-of-hospital cardiac arrest (OHCA) has been demonstrated. However, the effect of temporal difference on the clinical outcomes of OHCA remains inconclusive. Therefore, we conducted a retrospective study in an urban city of Taiwan between January 2018 and December 2020 in order to investigate the relationship between temporal differences and the return of spontaneous circulation (ROSC), sustained (≥24 h) ROSC, and

survival to discharge in patients with OHCA. Of the 842 patients with OHCA, 371 occurred in the daytime, 250 in the evening, and 221 at night. During nighttime, there was a decreased incidence of OHCA, but the outcomes of OHCA were significant poor compared to the incidents during the daytime and evening. After multivariate adjustment for influencing factors, OHCAs occurring at night were independently associated with lower probabilities of achieving sustained ROSC (aOR = 0.489, 95% CI: 0.285-0.840, p = 0.009) and survival to discharge (aOR = 0.147, 95% CI: 0.03-0.714, p = 0.017). Subgroup analyses revealed significant temporal differences in male patients, older adult patients, those with longer response times (≥5 min), and witnessed OHCA. The effects of temporal difference on the outcome of OHCA may be a result of physiological factors, underlying etiology of arrest, resuscitative efforts in prehospital and in-hospital stages, or a combination of factors.

2. J Clin Psychiatry. 2021 Nov 9;83(1):21m13962. doi: 10.4088/JCP.21m13962.
Comorbid Psychiatric Disorders in Patients Hospitalized for Pulmonary Embolism and Acute Myocardial Infarction: A Japanese Nationwide Database Study.
Takahashi K(1)(2), Uchida H(1)(2), Suzuki T(1)(3), Mimura M(1), Ishida T(4)(5).
ABSTRACT
Objective: While the most common cause of sudden cardiac arrest (SCA) in the general population is ischemic cardiac disease including acute myocardial infarction (AMI), previous preliminary data highlighted pulmonary embolism (PE) as a common cause of SCA among psychiatric patients. The aim of this study was to examine the proportion of patients with comorbid psychiatric disorders among patients hospitalized for either AMI or PE using a Japanese nationwide database. Methods: This study used Diagnosis Procedure Combination (DPC) data between April 2013 and March 2018 provided by the Ministry of Health, Labor, and Welfare. The DPC data included information on the causes of hospitalization and comorbidities of psychiatric diseases among inpatients in all acute care hospitals in Japan. The proportions of patients with schizophrenia (ICD-10 code F20), mood disorders (F31 or F32), and no psychiatric disorders were analyzed among patients who were hospitalized for AMI and PE. Results: The data from 351,159 AMI patients (mean age = 70.3 years) and 52,036 PE patients (mean age = 69.2 years) were used. Mortality rates were 8.0%-14.4% in AMI patients and 4.3%-9.8% in PE patients. The AMI group was predominantly male. The proportions of patients with schizophrenia and mood disorder were significantly higher in the PE group than in the AMI group (schizophrenia: 2.53% [1,314/52,036] vs 0.55% [1,922/351,159], P < .001; mood disorder: 2.94% [1,532/52,036] vs 0.60% [2,099/351,159], P < .001). Conclusions: The results highlight the importance of PE as a major cause of SCA in this specific population and the need for preventive measures to mitigate the mortality gap among patients with psychiatric disorders.

3. NASN Sch Nurse. 2021 Nov 8:1942602X211046048. doi: 10.1177/1942602X211046048. Online ahead of print.
School Nurses on the Front Lines of Healthcare: Emergencies Associated With Sport and Physical Activities (Part 2): Sudden Cardiac Arrest, Hypovolemic Shock, and Spinal Cord Injury.
Swaffield TP(1), Olympia RP(2).
ABSTRACT
Sport participation is an important part of the development, both physically and mentally, of children and adolescents in the United States. Illness and injury associated with sport and physical activities may occur in the school setting. Although most sport-related illness and injury in students are considered minor emergencies, life-threatening illnesses or injuries may occur. It is important for the school nurse to recognize potential life-threatening emergencies associated with sport and physical activity, to initiate stabilization of the student with life-threatening symptoms, and to triage these students to an appropriate level of care (back to the classroom, home with their guardian with

follow up at their primary healthcare provider's office, or directly to the closest emergency department via Emergency Medical Services). This article specifically describes the initial assessment and management of three potentially life-threatening conditions associated with sport and physical activity, namely sudden cardiac arrest, hypovolemic shock, and spinal cord injury.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

1. Resuscitation. 2021 Oct 29:S0300-9572(21)00446-9. doi: 10.1016/j.resuscitation.2021.10.039. Online ahead of print.
Pulse oximetry plethysmography: a new approach for physiology-directed CPR?
Shepard LN(1), Berg RA(1), Morgan RW(2).
NO ABSTRACT AVAILABLE

DRUGS

1. Expert Opin Pharmacother. 2021 Nov 11. doi: 10.1080/14656566.2021.2003329. Online ahead of print.
The effect of dapagliflozin on ventricular arrhythmias, cardiac arrest, or sudden death in people with heart failure: a tick in another box for sodium-glucose cotransporter 2 inhibitors.
Koufakis T(1), Giannakoulas G(2), Zebekakis P(1), Kotsa K(1).
ABSTRACT
INTRODUCTION: Despite the progress made in the treatment of heart failure with reduced ejection fraction (HFrEF) in recent years, the prognosis of the disease remains poor, with ventricular arrhythmias (VA) contributing significantly to increased mortality. AREAS COVERED: A recently published post hoc analysis of the DAPA-HF trial evaluated the effect of the sodium-glucose cotransporter 2 inhibitor (SGLT2i) dapagliflozin versus placebo on the incidence of VA, resuscitated cardiac arrest, or sudden death among people with HFrEF. During a median follow-up of 18.2 months, the composite primary outcome occurred in 140 (5.9%) people who received dapagliflozin compared to 175 (7.4%) participants in the placebo arm (hazard ratio 0.79; 95 confidence interval 0.63-0.99, P=0.037). Animal studies suggest that SGLT2i could ameliorate the deleterious effects of myocardial injury, through various mechanisms, including reduced sympathetic activity, improved oxidative stress, tissue oxygenation, autophagy, heart energy metabolism, and promotion of cardiac remodeling. EXPERT OPINION: Taken together, the above findings indicate a place for SGLT2i in future trials investigating novel treatments to improve survival in patients with acute cardiovascular episodes. This is primarily applicable for acute decompensated HF; however, their use could also be evaluated in other conditions that induce VA, such as acute coronary syndromes.

2. BMJ. 2021 Nov 10;375:e066534. doi: 10.1136/bmj-2021-066534.

Epinephrine before defibrillation in patients with shockable in-hospital cardiac arrest: propensity matched analysis.

Evans E(1), Swanson MB(1)(2), Mohr N(1), Boulos N(3), Vaughan-Sarrazin M(4)(5), Chan PS(6), Girotra S(7)(8); American Heart Association's Get With The Guidelines-Resuscitation investigators.

ABSTRACT

OBJECTIVE: To determine the use of epinephrine (adrenaline) before defibrillation for treatment of in-hospital cardiac arrest due to a ventricular arrhythmia and examine its association with patient survival. DESIGN: Propensity matched analysis. SETTING: 2000-18 data from 497 hospitals participating in the American Heart Association's Get With The Guidelines-Resuscitation registry. PARTICIPANTS: Adults aged 18 and older with an index in-hospital cardiac arrest due to an initial shockable rhythm treated with defibrillation. INTERVENTIONS: Administration of epinephrine before first defibrillation. MAIN OUTCOME MEASURES: Survival to discharge; favorable neurological survival, defined as survival to discharge with none, mild, or moderate neurological disability measured using cerebral performance category scores; and survival after acute resuscitation (that is, return of spontaneous circulation for >20 minutes). A time dependent, propensity matched analysis was performed to adjust for confounding due to indication and evaluate the independent association of epinephrine before defibrillation with study outcomes. RESULTS: Among 34 820 patients with an initial shockable rhythm, 9630 (27.6%) were treated with epinephrine before defibrillation, contrary to current guidelines. In comparison with participants treated with defibrillation first, participants receiving epinephrine first were less likely to have a history of myocardial infarction or heart failure, but more likely to have renal failure, sepsis, pneumonia, and receive mechanical ventilation before in-hospital cardiac arrest (P<0.0001 for all). Treatment with epinephrine before defibrillation was strongly associated with delayed defibrillation (median 3 minutes v 0 minutes). In propensity matched analysis (9011 matched pairs), epinephrine before defibrillation was associated with lower odds of survival to discharge (25.2% v 29.9%; adjusted odds ratio 0.81, 95% confidence interval 0.74 to 0.88; P<0.001), favorable neurological survival (18.6% v 21.4%; 0.85, 0.76 to 0.92; P<0.001), and survival after acute resuscitation (64.4% v 69.4%; 0.76, 0.70 to 0.83; P<0.001). The above findings were consistent in a range of sensitivity analyses, including matching according to defibrillation time. CONCLUSIONS: Contrary to current guidelines that prioritize immediate defibrillation for in-hospital cardiac arrest due to a shockable rhythm, more than one in four patients are treated with epinephrine before defibrillation, which is associated with worse survival.

3. Resuscitation. 2021 Nov 5:S0300-9572(21)00450-0. doi: 10.1016/j.resuscitation.2021.10.041. Online ahead of print.

Distal femur versus Humeral or Tibial IO, Access in Adult Out of Hospital Cardiac Resuscitation.

Giovanni Rayas E(1), Winckler C(2), Bolleter S(3), String Fellow M(4), Miramontes D(5), Shumaker J(6), Lewis A(7), Wampler D(2).

ABSTRACT

BACKGROUND: Intraosseous (IO) vascular access is a well-established method for fluid and drug administration in the critically ill. The Food and Drug Administration has approved adult IO access at the proximal humerus, proximal tibia, and the sternum; all three sites have significant limitations. The Distal Femur is away from the chest, with high flow rates. The objective of this study was to evaluate the distal femur site during resuscitation of adult out-of-hospital cardiac arrest. METHODS: A retrospective analysis of adult out of hospital cardiac arrest patients treated by the San Antonio Fire Department. IO access was obtained by first-responders (paramedics or EMT-basic) or EMS paramedics. All resuscitation attempts from 2017-2018 data were analyzed. The protocol did not dictate the preference of IO site. The primary measure: number of OHCA patients in each subgroup:

IO femur, IO humerus, IO tibia. Secondary measures: paramedic or basic operator, dislodgement rate, and total fluid infused. RESULTS: There were 2,198 patients meeting inclusion criteria: 888 femur, 696 humerus, 432 tibia. Distal femur increased 2.5 times in the 2018 cohort compared to the 2017 cohort, with a corresponding decrease in humerus (factor of 0.29). Proximal tibia remained unchanged. Dislodgement rates and total infusion (ml) remained unchanged. CONCLUSIONS: The distal femur IO was feasible and associated with similar measured performance parameters as other IO sites in adult OHCA for both advanced and basic life support personnel.

4. Am J Respir Crit Care Med. 2021 Oct 15;204(8):977-985. doi: 10.1164/rccm.202012-4437OC.
The Effect of Epinephrine Dosing Intervals on Outcomes from Pediatric In-Hospital Cardiac Arrest.
Kienzle MF(1), Morgan RW(1), Faerber JA(2), Graham K(1), Katcoff H(2), Landis WP(1), Topjian AA(1), Kilbaugh TJ(1), Nadkarni VM(1), Berg RA(1), Sutton RM(1).

ABSTRACT
Rationale: Animal studies of cardiac arrest suggest that shorter epinephrine dosing intervals than currently recommended (every 3-5 min) may be beneficial in select circumstances. Objectives: To evaluate the association between epinephrine dosing intervals and pediatric cardiac arrest outcomes. Methods: Single-center retrospective cohort study of children (<18 years of age) who received ⩾1 minute of cardiopulmonary resuscitation and ⩾2 doses of epinephrine for an index in-hospital cardiac arrest. Exposure was epinephrine dosing interval ⩽2 minutes (frequent epinephrine) versus >2 minutes. The primary outcome was survival to hospital discharge with a favorable neurobehavioral outcome (Pediatric Cerebral Performance Category score 1-2 or unchanged). Logistic regression evaluated the association between dosing interval and outcomes; additional analyses explored duration of cardiopulmonary resuscitation (CPR) as a mediator. In a subgroup, the effect of dosing interval on diastolic blood pressure was investigated. Measurements and Main Results: Between January 2011 and December 2018, 125 patients met inclusion/exclusion criteria; 33 (26%) received frequent epinephrine. Frequent epinephrine was associated with increased odds of survival with favorable neurobehavioral outcome (adjusted odds ratio, 2.56; 95% confidence interval, 1.07-6.14; P = 0.036), with 66% of the association mediated by CPR duration. Delta diastolic blood pressure was greater after the second dose of epinephrine among patients who received frequent epinephrine (median [interquartile range], 6.3 [4.1 to 16.9] vs. 0.13 [-2.3 to 1.9] mm Hg; P = 0.034). Conclusions: In patients who received at least two doses of epinephrine, dosing intervals ⩽2 minutes were associated with improved neurobehavioral outcomes compared with dosing intervals >2 minutes. Mediation analysis suggests that improved outcomes are largely due to frequent epinephrine shortening duration of CPR.

TRAUMA

No articles identified.

VENTILATION

1. Aten Primaria. 2021 Nov;53(9):102062. doi: 10.1016/j.aprim.2021.102062. Epub 2021 May 24.
[I-Gel® laryngeal mask versus bag-valve-mask in instrumental cardiopulmonary resuscitation under capnographic monitoring: Cluster-randomized pilot clinical trial]. [Article in Spanish]
Cereceda-Sánchez FJ(1), Clar-Terradas J(2), Moros-Albert R(2), Mascaró-Galmés A(2), Navarro-Miró M(2), Molina-Mula J(3).

ABSTRACT

OBJECTIVE: To compare the basic airway and the advanced airway with the supraglottic device I-Gel®, by means of capnography during intermediate CPR. DESIGN: Randomized experimental pilot study by groups. SETTING: Out-hospital care basic life support units on the Island of Mallorca. PARTICIPANTS: Adults attended after cardiorespiratory arrest of non-traumatic origin. INTERVENTIONS: Advanced airway management during instrumental CPR with I-Gel® or basic CPR with bag-valve-mask, under capnographic monitoring. MAIN MEASUREMENTS: Capnometric levels obtained according to the device used, number of insertions of the I-Gel®, cases without achieving correct insertion/ventilation by branches, achievement of ROSC in CPR and number of hospital live admissions. RESULTS: Twenty-three cases were recruited for analysis. The insertion success rate of the I-Gel® was 92.9% at the first attempt, the mean capnometric values were 16.3mmHg in the control group and 27.4% in the intervention group. 34.8% (n=8) of the patients achieved spontaneous circulation recovery at some point and 26.1% (n=6) were admitted to hospital alive. The survival analysis, taking into account the arrival of the unit and the first minute of ventilations recorded together with the variable hospital admission, suggests a certain trend of greater survival in the intervention branch (P=.066). CONCLUSIONS: The use of I-Gel® raises an improvement in the ventilation of the patients in PCR, evidenced by the mean capnometric values in the intervention group, finding no correlation with CPR outcome variables.

CERERBRAL MONITORING

1. Resuscitation. 2021 Nov 5:S0300-9572(21)00451-2. doi: 10.1016/j.resuscitation.2021.10.043. Online ahead of print.
Optimizing Cerebral Oxygen Delivery After Cardiac Arrest: A Role for Neuromonitoring.
Coppler PJ(1), Elmer J(2).
NO ABSTRACT AVAILABLE

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. J Clin Med. 2021 Oct 28;10(21):5018. doi: 10.3390/jcm10215018.
The Automated External Defibrillator: Heterogeneity of Legislation, Mapping and Use across Europe. New Insights from the ENSURE Study.
Baldi E(1)(2)(3), Grieco NB(3)(4), Ristagno G(3)(5), Alihodžić H(6), Canon V(7)(8), Birkun A(9), Cresta R(10)(11), Cimpoesu D(12), Clarens C(13), Ganter J(14), Markota A(15)(16), Mols P(17), Nikolaidou O(18), Quinn M(19), Raffay V(20)(21), Ortiz FR(22), Salo A(23), Stieglis R(24), Strömsöe A(25)(26)(27), Tjelmeland I(28)(29)(30), Trenkler S(31), Wnent J(30)(32)(33), Grasner JT(30)(32), Böttiger BW(34)(35), Savastano S(3)(36).
ABSTRACT
INTRODUCTION: The rapid use of an automated external defibrillator (AED) is crucial for increased survival after an out-of-hospital cardiac arrest (OHCA). Many factors could play a role in limiting the chance of an AED use. We aimed to verify the situation regarding AED legislation, the AED mapping system and first responders (FRs) equipped with an AED across European countries. METHODS: We performed a survey across Europe entitled "European Study about AED Use by Lay Rescuers" (ENSURE), asking the national coordinators of the European Registry of Cardiac Arrest (EuReCa) program to complete it. RESULTS: Nineteen European countries replied to the survey request for a

population covering 128,297,955 inhabitants. The results revealed that every citizen can use an AED in 15 countries whereas a training certificate was required in three countries. In one country, only EMS personnel were allowed to use an AED. An AED mapping system and FRs equipped with an AED were available in only 11 countries. The AED use rate was 12-59% where AED mapping and FR systems were implemented, which was considerably higher than in other countries (0-7.9%), reflecting the difference in OHCA survival. CONCLUSIONS: Our survey highlighted a heterogeneity in AED legislation, AED mapping systems and AED use in Europe, which was reflected in different AED use and survival.

2. Resuscitation. 2021 Nov 9:S0300-9572(21)00453-6. doi: 10.1016/j.resuscitation.2021.11.002. Online ahead of print.

Geographic Variation and Temporal Trends in Management and Outcomes of Cardiac Arrest Complicating Acute Myocardial Infarction in the United States.

Atreya AR(1), Harsha Patlolla S(2), Devireddy CM(3), Jaber WA(3), Tanveer Rab S(3), Nicholson WJ(3), Douglas JS(3), King SB(3), Vallabhajosyula S(4).

ABSTRACT

BACKGROUND: Limited studies have evaluated regional disparities in the care of acute myocardial infarction (AMI) patients with cardiac arrest (CA). This study sought to evaluate 18-year national trends, resource utilization, and geographical variation in outcomes in AMI-CA admissions. METHODS AND RESULTS: Using the National Inpatient Sample (2000-2017), we identified adults with AMI and concomitant CA admitted to the United States census regions of Northeast, Midwest, South, and West. Clinical outcomes of interest included in-hospital mortality, use of coronary angiography, percutaneous coronary intervention (PCI), mechanical circulatory support (MCS), hospitalization costs and length of stay. Of 9,680,257 admissions for AMI, 494,083 (5.1%) had concomitant CA. The West (6.0%) had higher prevalence compared to the Northeast (4.4%), Midwest (5.0%), and South (5.1%), p<0.001. Admissions in the West had higher rates of STEMI, cardiogenic shock, multiorgan failure, mechanical ventilation, and hemodialysis. Northeast admissions had lower use of coronary angiography (52.0% vs. 67.9% vs. 60.9% vs. 61.5%), PCI (38.7% vs. 51.9% vs. 44.8% vs. 46.7%), and MCS (18.4% vs. 21.8% vs. 18.1%, vs. 20.0%) compared to the Midwest, West and South (all p<0.001). Compared with the Northeast, adjusted in-hospital mortality was higher in the Midwest (odds ratio [OR] 1.06 [95% confidence interval {CI} 1.03-1.08]), South (OR 1.11 [95% CI 1.09-1.13]) and highest in the West (OR 1.16 [95% CI 1.13-1.18]), all p<0.001. Temporal trends showed a decline in in-hospital mortality except in the West, which showed a slight increase. CONCLUSIONS: There remain significant regional disparities in the management and outcomes of AMI-CA.

3. Resuscitation. 2021 Nov 9:S0300-9572(21)00452-4. doi: 10.1016/j.resuscitation.2021.11.001. Online ahead of print.

Longer Retrieval Distances to the Automated External Defibrillator Reduces Survival After Out-of-Hospital Cardiac Arrest.

Sarkisian L(1), Mickley H(2), Schakow H(3), Gerke O(4), Michael Starck S(5), Junghans Jensen J(6), Eifer Møller J(7), Jørgensen G(8), Lund Henriksen F(9).

ABSTRACT

AIMS: To evaluate and compare survival after out-of-hospital (OHCA), where an automated external defibrillator (AED) was used, in densely, moderately and thinly populated areas. Also, to evaluate the association between AED retrieval distance and survival after OHCA. METHODS: From 2014 to 2018, AEDs used during OHCA in the region of Southern Denmark were systematically collected. OHCAs were included if the OHCA address was known. OHCAs at nursing homes were excluded. To evaluate

population density, a map with 1000x1000 meter grid cells was used with each cell color-graded according to the number of inhabitants. Densely, moderately and thinly populated areas were defined as ≥200 inhabitants, 20-199 inhabitants and 0-19 inhabitants per km2, respectively. Primary outcome was 30-day survival. RESULTS: A total of 423 cases of OHCA were included, of which 207 (49%) occurred in densely populated areas, while 78 (18%) and 138 (33%) occurred in moderately and thinly populated areas, respectively. AED retrieval distances were: densely populated 105 meters (IQR 5-450), moderately populated 220 meters (IQR 5-450) and thinly populated 350 meters (IQR 5-1500) (P<0.001). Thirty-day survival was 40%, 31% and 34%, respectively (P=0.3). In a multivariable regression analysis, mortality increased with 10% per 100 meters an AED was placed further away from the site of OHCA. CONCLUSION: Survival after OHCA, where an AED was used, did not seem to differ in thinly, moderately and densely populated areas. The length of the AED retrieval distance, however, was correlated with reduced survival after adjusting for other potentially explanatory variables.

4. Circ J. 2021 Nov 10. doi: 10.1253/circj.CJ-21-0341. Online ahead of print.
Laypersons' Psychological Barriers Against Rescue Actions in Emergency Situations - A Questionnaire Survey.
Shida H(1), Nishiyama C(2), Okabayashi S(3), Yamamoto Y(4), Shimamoto T(3), Kawamura T(3), Sakamoto T(5), Iwami T(3).
ABSTRACT
BACKGROUND: Although bystanders' performance is important to improve outcomes of patients after cardiac arrests, few studies have investigated the barriers of bystanders, including those who could not perform cardiopulmonary resuscitation or any other rescue actions in emergency situations. This study aimed to assess the relationship between the psychological barriers of laypersons who encountered emergency situations and their rescue actions.Methods and Results:A questionnaire survey was conducted and this included laypersons who had encountered emergency situations during the last 5 years. Six questions were about the psychological barriers and 8 questions were about the laypersons' rescue actions. The primary outcome was any rescue actions performed by laypersons in an actual emergency situation. Overall, 7,827 (92.8%) of 8,430 laypersons responded; of them, 1,361 (16.1%) had encountered emergency situations during the last 5 years, and 1,220 (14.5%) were eligible for inclusion in the analyses. Of the 6 psychological barriers, "fear of approaching a collapsed person" (adjusted odds ratio [AOR] 0.50; 95% confidence interval [95% CI] 0.32-0.79) and "difficulties in judging whether to perform any rescue action" (AOR 0.63; 95% CI 0.40-0.99) were significantly associated with performing any rescue actions. CONCLUSIONS: The fear of approaching a collapsed person and difficulties in judging whether to take any actions were identified as the psychological barriers in performing any rescue actions by laypersons who encountered emergency situations.

5. Resuscitation. 2021 Oct 29:S0300-9572(21)00445-7. doi: 10.1016/j.resuscitation.2021.10.038. Online ahead of print.
Racial differences in outcomes and utilization after cardiac arrest in the USA: a longitudinal study comparing different geographical regions in the USA from 2006-2018.
Rachoin JS(1), Olsen P(2), Gaughan J(3), Cerceo E(4).
ABSTRACT
AIM: Healthcare disparities can affect access and quality of care among many in the United States (US). In addition to race, we sought to assess if geography affected rates of cardiac arrest, and the subsequent outcomes. METHODS: Using the National Inpatient Sample database from 2006-2018, we assessed rates of cardiac arrest (out of hospital that survived to admission and in-hospital) and

cardiac catheterization, and length of stay (LOS) in four regions: Northeast (NE), South (SO) West (W) and Midwest (MW). RESULTS: Cardiac arrest increased from 27,611 (2006) to 43,333 (2018). The proportion of African American (AA) patients experiencing cardiac arrest significantly increased from 11.9% to 18.8%. The mortality decreased from 65.4% to 60.8% in all patients and 70.2% to 61.4% in AA. Mortality in AA remained higher than non-AA (OR, 1.09 [1.08-1.11], p<0.001). When regions were compared for mortality, MW had a lower risk than NE 0.94[0.92-9.96]; SO 1.05[1.04-1.07] and W 1.11[1.09-1.13] were higher compared to NE. LOS decreased slightly from 9.0 days to 8.7 in all patients. LOS for AA was longer than non-AA (11.3 vs 8.6 days) with the NE having the longest LOS. AA were less likely to receive cardiac catheterization than non-AA (9.5% vs 15%) with the largest racial gap in the MW region. CONCLUSION: The proportion of AA with cardiac arrests increased over the study period. Mortality and LOS improved significantly in AA from 2006 to 2018 but remain significantly higher than non-AA patients. Future research should identify contributors to these concerning trends.

6. Resuscitation. 2021 Oct 29:S0300-9572(21)00444-5. doi: 10.1016/j.resuscitation.2021.10.037. Online ahead of print.
Are there disparities in the location of Automated External Defibrillators in England?
Brown TP(1), Perkins GD(2), Smith CM(3), Deakin CD(4), Fothergill R(5).
ABSTRACT
BACKGROUND: Early defibrillation is an essential element of the chain of survival for out-of-hospital cardiac arrest (OHCA). Public access defibrillation (PAD) programmes aim to place automated external defibrillators (AED) in areas with high OHCA incidence, but there is sometimes a mismatch between AED density and OHCA incidence. OBJECTIVES: This study aimed to assess whether there were any disparities in the characteristics of areas that have an AED and those that do not in England. METHODS: Details of the location of AEDs registered with English Ambulance Services were obtained from individual services or internet sources. Neighbourhood characteristics of lower layer super output areas (LSOA) were obtained from the Office for National Statistics. Comparisons were made between LSOAs with and without a registered AED. RESULTS: AEDs were statistically more likely to be in LSOAs with a lower residential but higher workplace population density, with people predominantly from a white ethnic background and working in higher socio-economically classified occupations (p<0.05). There was a significant correlation between AED coverage and the LSOA Index of Multiple Deprivation (IMD) (r=0.79, p=0.007), with only 27.4% in the lowest IMD decile compared to about 45% in highest. AED density varied significantly across the country from 0.82/km2 in the north east to 2.97/km2 in London. CONCLUSIONS: In England, AEDs were disproportionately placed in more affluent areas, with a lower residential population density. This contrasts with locations where OHCAs have previously occurred. Future PAD programmes should give preference to areas of higher deprivation and be tailored to the local community.

7. Chest. 2021 Nov;160(5):e541-e542. doi: 10.1016/j.chest.2021.06.081.
Partial Code in Cardiac Arrest: Should It Be Allowed as an Exception?
Cheung EH(1), Cheung JC(2), Yip YY(3).
NO ABSTRACT AVAILABLE

POST-CARDIAC ARREST TREATMENTS

1. J Clin Med. 2021 Nov 6;10(21):5191. doi: 10.3390/jcm10215191.
Early Coronary Angiography Is Associated with Improved 30-Day Outcomes among Patients with Out-of-Hospital Cardiac Arrest.

Lim SL(1), Lau YH(2), Chan MY(1), Chua T(2), Tan HC(1), Foo D(3), Lim ZY(4), Liew BW(5), Shahidah N(6), Mao DR(7), Cheah SO(8), Chia MYC(9), Gan HN(10), Leong BSH(11), Ng YY(9)(12), Yeo KK(2), Ong MEH(6)(13).

ABSTRACT

We evaluated the association between early coronary angiography (CAG) and outcomes in resuscitated out-of-hospital cardiac arrest (OHCA) patients, by linking data from the Singapore Pan-Asian Resuscitation Outcomes Study, with a national registry of cardiac procedures. The 30-day survival and neurological outcome were compared between patients undergoing early CAG (within 1-calender day), versus patients not undergoing early CAG. Inverse probability weighted estimates (IPWE) adjusted for non-randomized CAG. Of 976 resuscitated OHCA patients of cardiac etiology between 2011-2015 (mean(SD) age 64(13) years, 73.7% males), 337 (34.5%) underwent early CAG, of whom, 230 (68.2%) underwent PCI. Those who underwent early CAG were significantly younger (60(12) vs. 66(14) years old), healthier (42% vs. 59% with heart disease; 29% vs. 44% with diabetes), more likely males (86% vs. 67%), and presented with shockable rhythms (69% vs. 36%), compared with those who did not. Early CAG with PCI was associated with better survival and neurological outcome (adjusted odds ratio 1.91 and 1.82 respectively), findings robust to IPWE adjustment. The rates of bleeding and stroke were similar. CAG with PCI within 24 h was associated with improved clinical outcomes after OHCA, without increasing complications. Further studies are required to identify the characteristics of patients who would benefit most from this invasive strategy.

2. Acad Emerg Med. 2021 Nov 12. doi: 10.1111/acem.14416. Online ahead of print.

Clinical Factors Associated with Significant Coronary Lesions Following Out-Of-Hospital Cardiac Arrest.

Helfer DR(1), Helber AR(1), Ferko AR(2), Klein DD(3), Elchediak DS(3), Deaner TS(2), Slagle D(4), White WB(4), Buckler DG(5), Mitchell OJL(6)(7), Fiorilli PN(8), Isenberg D(3), Nomura J(4), Murphy KA(4), Sigal A(2), Saif H(9), Reihart MJ(10), Vernon TM(10), Abella BS(1)(6).

ABSTRACT

OBJECTIVES: Out-of-hospital cardiac arrest (OHCA) afflicts >350,000 people annually in the U.S. While post-arrest coronary angiography (CAG) with percutaneous coronary intervention (PCI) has been associated with improved survival in observational cohorts, substantial uncertainty exists regarding patient selection for post-arrest CAG. We tested the hypothesis that symptoms consistent with acute coronary syndrome (ACS), including chest discomfort, prior to OHCA are associated with significant coronary lesions identified on post-arrest CAG. METHODS: We conducted a multicenter retrospective cohort study among eight regional hospitals. Adult patients who experienced atraumatic OHCA with successful initial resuscitation and subsequent CAG between 1/2015-12/2019 were included. We collected data on prehospital documentation of potential ACS symptoms prior to OHCA, as well as clinical factors readily available during post-arrest care. The primary outcome in multivariable regression modeling was the presence of significant coronary lesions (defined as >50% stenosis of left main or >75% stenosis of other coronary arteries). RESULTS: 400 patients were included. Median age was 59 y (IQR 51-69 y); 31% were female. At least one significant stenosis was found in 62%, of which 71% received PCI. Clinical factors independently associated with a significant lesion included a history of myocardial infarction (aOR 6.5 [95% CI 1.3-32.4], p=0.02), pre-arrest chest discomfort (aOR 4.8 [95% CI 2.1 -11.8], p=<0.001), ST-segment elevations (aOR 3.2 [95% CI 1.7-6.3], p<0.001) and an initial shockable rhythm (aOR 1.9 [95% CI 1.0-3.4], p=0.05). CONCLUSIONS: Among survivors of OHCA receiving CAG, history of pre-arrest chest discomfort was significantly and independently associated with significant coronary artery lesions on post-arrest CAG. This suggests we may be able to use pre-arrest symptoms to better risk stratify patients following OHCA to decide who will benefit from invasive angiography.

3. Chin Med J (Engl). 2021 Nov 10. doi: 10.1097/CM9.0000000000001807. Online ahead of print.

Effects of early hemodynamics, oxygen metabolism, and lactate dynamics on prognosis of post-cardiac arrest syndrome.
Zhang MQ(1), Zhang Q, Yu YN, An L, Qi ZJ, Li CS.
NO ABSTRACT AVAILABLE

4. Chin Med J (Engl). 2021 Nov 10. doi: 10.1097/CM9.0000000000001764. Online ahead of print.
Overexpression of programmed cell death-1 (PD-1) affects circulatory Th1 and Th2 cells in patients with cardiac arrest in the early period after the return of spontaneous circulation.
Yu Y(1), Xie M, Li J, Hang C, Shao F, Li C.
NO ABSTRACT AVAILABLE

TARGETED TEMPERATURE MANAGEMENT

1. Resuscitation. 2021 Oct 28;169:97-104. doi: 10.1016/j.resuscitation.2021.10.036. Online ahead of print.
Women receive less targeted temperature management than men following out-of-hospital cardiac arrest due to early care limitations - A study from the CARES Investigators.
Morris NA(1), Mazzeffi M(2), McArdle P(3), May TL(4), Burke JF(5), Bradley SM(6), Agarwal S(7), Badjatia N(8), Perman SM(9); CARES Surveillance Group.
ABSTRACT
BACKGROUND: Women experience worse neurological outcomes following out-of-hospital cardiac arrest (OHCA). It is unknown whether sex disparities exist in the use of targeted temperature management (TTM), a standard of care treatment to improve neurological outcomes. METHODS: We performed a retrospective study of prospectively collected patients who survived to hospital admission following OHCA from the Cardiac Arrest Registry to Enhance Survival from 2013 through 2019. We compared receipt of TTM by sex in a mixed-effects model adjusted for patient, arrest, neighborhood, and hospital factors, with the admitting hospital modeled as a random intercept. RESULTS: Among 123,419 patients, women had lower rates of shockable rhythms (24.4 % vs. 39.2%, P < .001) and lower rates of presumed cardiac aetiologies for arrest (74.3% vs. 81.1%, P < .001). Despite receiving a similar rate of TTM in the field (12.1% vs. 12.6%, P = .02), women received less TTM than men upon admission to the hospital (41.6% vs. 46.4%, P < .001). In an adjusted mixed-effects model, women were less likely than men to receive TTM (Odds Ratio 0.91, 95% Confidence Interval 0.89 to 0.94). Among the 27,729 patients with data indicating the reason for not using TTM, a higher percentage of women did not receive TTM due to Do-Not-Resuscitate orders/family requests (15.1% vs. 11.4%, p < .001) and non-shockable rhythms (11.1% vs. 8.4%, p < .001). CONCLUSIONS: We found that women received less TTM than men, likely due to early care limitations and a preponderance of non-shockable rhythms.

2. J Am Heart Assoc. 2021 Nov 8:e017773. doi: 10.1161/JAHA.121.023934. Online ahead of print.
Hispanic/Latino-Serving Hospitals Provide Less Targeted Temperature Management Following Out-of-Hospital Cardiac Arrest.
Morris NA(1), Mazzeffi M(2), McArdle P(3), May TL(4), Waldrop G(5), Perman SM(6), Burke JF(7), Bradley SM(8), Agarwal S(5), Figueroa JF(9), Badjatia N(1); CARES Surveillance Group.
ABSTRACT
Background Variation exists in outcomes following out-of-hospital cardiac arrest (OHCA), but whether racial and ethnic disparities exist in post-arrest provision of targeted temperature management (TTM) is unknown. Methods and Results We performed a retrospective analysis of a

prospectively collected cohort of patients who survived to admission following OHCA from the Cardiac Arrest Registry to Enhance Survival, whose catchment area represents ~50% of the United States from 2013-2019. Our primary exposure was race/ethnicity and primary outcome was utilization of TTM. We built a mixed-effects model with both state of arrest and admitting hospital modeled as random intercepts to account for clustering. Among 96,695 patients (24.6% Black, 8.0% Hispanic/Latino, 63.4% White), a smaller percentage of Hispanic/Latino patients received TTM than Black or White patients (37.5% vs. 45.0 % vs 43.3%, P < .001) following OHCA. In the mixed-effects model, Black patients (Odds Ratio [OR] 1.153, 95% Confidence Interval [CI] 1.102-1.207, P < .001) and Hispanic/Latino patients (OR 1.086, 95% CI 1.017-1.159, P < .001) were slightly more likely to receive TTM compared to White patients, perhaps due to worse admission neurological status. We did find community level disparity as Hispanic/Latino-serving hospitals (defined as the top decile of hospitals that cared for the highest proportion of Hispanic/Latino patients) provided less TTM (OR 0.587, 95% CI 0.474 to 0.742, P < .001). Conclusions Reassuringly, we did not find evidence of intrahospital or interpersonal racial or ethnic disparity in the provision of TTM. However, we did find inter-hospital, community level disparity. Hispanic/Latino-serving hospitals provided less guideline-recommended TTM after OHCA.

3. Med Klin Intensivmed Notfmed. 2021 Nov;116(8):712-714. doi: 10.1007/s00063-021-00865-6. Epub 2021 Sep 20.
[The end of an era? Target temperature management after out-of-hospital cardiac arrest].
[Article in German]
Adler C(1)(2), Michels G(3).
NO ABSTRACT AVAILABLE

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. Clin Cardiol. 2021 Nov;44(11):1497-1505. doi: 10.1002/clc.23709. Epub 2021 Aug 24.
Cost-minimization analysis of a wearable cardioverter defibrillator in adult patients undergoing ICD explant procedures: Clinical and economic implications.
Boriani G(1), Mantovani LG(2)(3), Cortesi PA(2), De Ponti R(4), D'Onofrio A(5), Arena G(6), Curnis A(7), Forleo G(8), Guerra F(9), Porcu M(10), Sgarito G(11), Botto GL(12).
ABSTRACT
AIMS: Patients with permanently increased risk of sudden cardiac death (SCD) can be protected by implantable cardioverter defibrillators (ICD). If an ICD must be removed due to infection, for example, immediate reimplantation might not be possible or indicated. The wearable cardioverter defibrillator (WCD) is an established, safe and effective solution to protect patients from SCD during this high-risk bridging period. Very few economic evaluations on WCD use are currently available. METHODS: We conducted a systematic review to evaluate the available evidence of WCD in patients undergoing ICD explant/lead extraction. Additionally, a decision model was developed to compare use and costs of the WCD with standard therapy (in-hospital stay). For this purpose, a cost-minimization analysis was conducted, and complemented by a one-way sensitivity analysis. RESULTS: In the base case scenario, the WCD was less expensive compared to standard therapy. The cost-minimization analysis showed a cost reduction of €1782 per patient using the WCD. If costs of standard care were changed, cost savings associated with the WCD varied from €3500 to €0, assuming costs for standard care of €6800 to €3600. CONCLUSION: After ICD explantation, patients can be safely and effectively protected from SCD after hospital discharge through WCD utilization. Furthermore, the use of a WCD for this patient group is cost saving when compared to standard therapy.

2. Resuscitation. 2021 Nov;168:19-26. doi: 10.1016/j.resuscitation.2021.08.050. Epub 2021 Sep 8.
Peripheral perfusion index and diagnostic accuracy of the post-ROSC electrocardiogram in patients with medical out-of-hospital cardiac arrest.
Compagnoni S(1), Gentile FR(1), Baldi E(2), Contri E(3), Palo A(3), Primi R(4), Currao A(4), Bendotti S(4), Ziliani P(5), Ferrario Ormezzano M(4), Oltrona Visconti L(4), Savastano S(6).
ABSTRACT
AIM: A 12-lead electrocardiogram (ECG) after the return of spontaneous circulation (ROSC) is recommended to diagnose a ST-segment elevation myocardial infarction (STEMI). In the early post-ROSC phase, the ECG can show signs of ischemia not necessarily of coronary origin and post-ROSC hypoperfusion could affect ECG reliability. We sought for an association between peripheral perfusion index (PI) values after ROSC and the percentage of false-positive ECG for STEMI. METHODS: We considered all the consecutive patients with sustained ROSC after OHCA, admitted to the Fondazione IRCCS Policlinico San Matteo (Pavia) between January 1st, 2015 and December 31st, 2020. ECGs were defined false-positive if meeting the STEMI criteria but without a critical obstructive coronary artery disease worthy of treatment. The mean value of PI over 30 min-monitoring (MPI30) were calculated. RESULTS: Among 351 eligible patients post-ROSC ECG, PI monitoring and an invasive coronary angiography (ICA) were available in 84 cases. The rate of false positive was 16/54 (29.6%) and it differed significantly in the three MPI30 tertiles [T1 (0.2-1): 28.6%; T2 (1.1-2.5): 24.1%; T3 (2.6-6.9): 3.7%, p = 0.04; p for trend = 0.02]. Cardiac arrest duration [OR 1.06 (95 %CI 1-1.1), p = 0.007] and MPI30 [T3 vs T1: OR 0.09 (95 %CI 0.01-0.8), p = 0.03] were significantly associated with the probability of acquiring a false-positive ECG. This association was also confirmed when MPI30 was adjusted for cardiac arrest duration [OR 0.2 (95 %CI 0.1-0.6), p=<0.001]. CONCLUSIONS: The rate of false-positive ECG for STEMI after ROSC is related with low perfusion. Our results could help to identify the adequate candidates for an immediate ICA.

PEDIATRICS AND CHILDREN

1. Resuscitation. 2021 Nov 5:S0300-9572(21)00449-4. doi: 10.1016/j.resuscitation.2021.10.042. Online ahead of print.
Bystander cardiopulmonary resuscitation for paediatric out-of-hospital cardiac arrest in England: an observational registry cohort study.
Albargi H(1), Mallett S(2), Berhane S(3), Booth S(4), Hawkes C(4), Perkins GD(5), Norton M(6), Foster T(7), Scholefield B(8).
ABSTRACT
INTRODUCTION: Bystander cardiopulmonary resuscitation (BCPR) is strongly advocated by resuscitation councils for paediatric out-of-hospital cardiac arrests (OHCAs). However, there are limited reports on rates of BCPR in children and its relationship with return of spontaneous circulation (ROSC) or survival outcomes. OBJECTIVE: We describe the rate of BCPR and its association with any ROSC and survival- to- hospital-discharge. METHODS: We conducted retrospective analysis of prospectively collected paediatric (<18 years of age) OHCA cases in England; we included specialist registry patients treated by emergency medical services (EMS) with known BCPR status and outcome between January 2014 and November 2018. Data included patient demographics, aetiology, witness status, initial rhythm, EMS, season, time of day and bystander status. Associations between BCPR, and any ROSC and survival-to-hospital-discharge outcomes were explored using multivariable logistic regression. RESULTS: There were 2363 paediatric OHCAs treated across 11 EMS regions. BCPR was performed in 69.6% (1646/2363) of the cases overall (range 57.7% (206/367) to 83.7% (139/166) across EMS regions). Only 34.9% (550/1572) of BCPR cases were witnessed. Overall, any

ROSC was achieved in 22.8% (523/2289) and survival to hospital discharge in 10.8% (225/2066). Adjusted odds ratio (aOR) for any ROSC was significantly improved following BCPR compared to no BCPR (aOR 1.37, 95% CI 1.03-1.81), but adjusted odds ratio for survival-to-hospital-discharge were similar (aOR 1.01, 95% CI 0.66-1.55). CONCLUSIONS: BCPR was associated with improved rates of any ROSC but not survival-to-hospital-discharge. Variations in EMS BCPR rates may indicate opportunities for regional targeted increase in public BCPR education.

2. Front Pediatr. 2021 Oct 21;9:723327. doi: 10.3389/fped.2021.723327. eCollection 2021.
Pre-hospital Prognostic Factors of Out-of-Hospital Cardiac Arrest: The Difference Between Pediatric and Adult.
Cheng FJ(1), Wu WT(1), Hung SC(1), Ho YN(1), Tsai MT(1), Chiu IM(1), Wu KH(1).
ABSTRACT
The prognosis of out-of-hospital cardiac arrest (OHCA) is very poor. Although several pre-hospital factors are associated with survival, the different association of pre-hospital factors with OHCA outcomes in pediatric and adult groups remain unclear. To assess the association of pre-hospital factors with OHCA outcomes among pediatric and adult groups, a retrospective observational study was conducted using the emergency medical service (EMS) database in Kaohsiung from January 2015 to December 2019. Pre-hospital factors, underlying diseases, and OHCA outcomes were collected for the pediatric (Age ≤ 20) and adult groups. Kaplan-Meier type plots and multivariable logistic regression were used to analyze the association between pre-hospital factors and outcomes. In total, 7,461 OHCAs were analyzed. After adjusting for EMS response time, bystander CPR, attended by EMT-P, witness, and pre-hospital defibrillation, we found that age [odds ratio (OR) = 0.877, 95% confidence interval (CI): 0.764-0.990, p = 0.033], public location (OR = 7.681, 95% CI: 1.975-33.428, p = 0.003), and advanced airway management (AAM) (OR = 8.952; 95% CI, 1.414-66.081; p = 0.02) were significantly associated with survival till hospital discharge in pediatric OHCAs. The results of Kaplan-Meier type plots with log-rank test showed a significant difference between the pediatric and adult groups in survival for 2 h (p < 0.001), 24 h (p < 0.001), hospital discharge (p < 0.001), and favorable neurologic outcome (p < 0.001). AAM was associated with improved survival for 2 h (p = 0.015), 24 h (p = 0.023), and neurologic outcome (p = 0.018) only in the pediatric group. There were variations in prognostic factors between pediatric and adult patients with OHCA. The prognosis of the pediatric group was better than that of the adult group. Furthermore, AAM was independently associated with outcomes in pediatric patients, but not in adult patients. Age and public location of OHCA were independently associated with survival till hospital discharge in both pediatric and adult patients.

EXTRACORPOREAL LIFE SUPPORT

No articles identified.

EXPERIMENTAL RESEARCH

1. Am J Emerg Med. 2021 Oct 24;51:176-183. doi: 10.1016/j.ajem.2021.10.030. Online ahead of print.

Injury characteristics and hemodynamics associated with guideline-compliant CPR in a pediatric porcine cardiac arrest model.

Salcido DD(1), Koller AC(2), Genbrugge C(3), Fink EL(4), Berg RA(5), Menegazzi JJ(2).

ABSTRACT

BACKGROUND: Guidelines for depth of chest compressions in pediatric cardiopulmonary resuscitation (CPR) are based on sparse evidence. OBJECTIVE: We sought to evaluate the performance of the two most widely recommended chest compression depth levels for pediatric CPR (1.5 in. and 1/3 the anterior-posterior diameter- APd) in a controlled swine model of asphyxial cardiac arrest. METHODS: We executed a 2-group, randomized laboratory study with an adaptive design allowing early termination for overwhelming injury or benefit. Forty mixed-breed domestic swine (mean weight = 26 kg) were sedated, anesthetized and paralyzed along with endotracheal intubation and mechanical ventilation. Asphyxial cardiac arrest was induced with fentanyl overdose. Animals were untreated for 9 min followed by mechanical CPR with a target depth of 1.5 in. or 1/3 the APd. Advanced life support drugs were administered IV after 4 min of basic resuscitation followed by defibrillation at 14 min. The primary outcomes were return of spontaneous circulation (ROSC), hemodynamics and CPR-related injury severity. RESULTS: Enrollment in the 1/3 APd group was stopped early due to overwhelming differences in injury. Twenty-three animals were assigned to the 1.5 in. group and 15 assigned to the 1/3 APd group, per an adaptive group design. The 1/3 APd group had increased frequency of rib fracture (6.7 vs 1.7, $p < 0.001$) and higher proportions of several anatomic injury markers than the 1.5 in. group, including sternal fracture, hemothorax and blood in the endotracheal tube ($p < 0.001$). ROSC and hemodynamic measures were similar between groups. CONCLUSION: In this pediatric model of cardiac arrest, chest compressions to 1/3APd were more harmful without a concurrent benefit for resuscitation outcomes compared to the 1.5 in. compression group.

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Monitoring Mitochondrial Partial Oxygen Pressure During Cardiac Arrest and Extracorporeal Cardiopulmonary Resuscitation. An Experimental Pilot Study in a Pig Model.

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ABSTRACT

Introduction: Ischemia and reperfusion are crucial in determining the outcome after cardiac arrest and can be influenced by extracorporeal cardiopulmonary resuscitation (ECPR). The effect of ECPR on the availability and level of oxygen in mitochondria remains unknown. The aim of this study was to find out if skin mitochondrial partial oxygen pressure (mitoPO2) measurements in cardiac arrest and ECPR are feasible and to investigate its course. Materials and Methods: We performed a feasibility test to determine if skin mitoPO2 measurements in a pig are possible. Next, we aimed to measure skin mitoPO2 in 10 experimental pigs. Measurements were performed using a cellular oxygen metabolism measurement monitor (COMET), at baseline, during cardiac arrest, and during ECPR using the controlled integrated resuscitation device (CIRD). Results: The feasibility test showed continuous mitoPO2 values. Nine experimental pigs could be measured. Measurements in six experimental pigs succeeded. Our results showed a delay until the initial spike of mitoPO2 after

ECPR initiation in all six experimental tests. In two experiments (33%) mitoPO2 remained present after the initial spike. A correlation of mitoPO2 with mean arterial pressure (MAP) and arterial partial oxygen pressure measured by CIRD (CIRD-PaO2) seemed not present. One of the experimental pigs survived. Conclusions: This experimental pilot study shows that continuous measurements of skin mitoPO2 in pigs treated with ECPR are feasible. The delay in initial mitoPO2 and discrepancy of mitoPO2 and MAP in our small sample study could point to the possible value of additional measurements besides MAP to monitor the quality of tissue perfusion during cardiac arrest and ECPR.

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Impact of lung structure on airway opening index during mechanical versus manual chest compressions in a porcine model of cardiac arrest.

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ABSTRACT

OBJECTIVES: The exhaled CO2 signal provides guidance during cardiopulmonary resuscitation. The Airway opening index (AOI) has been recently used to quantify chest-compression (CC) induced expired CO2 oscillations. We aimed to determine whether levels of intrathoracic pressures developed during CC or parameters related to lung structure may affect AOI. METHODS: Secondary analysis of a randomized animal study (n = 12) in a porcine model of cardiac arrest (CA) and cardiopulmonary resuscitation (CPR) during ambulance transport. Animals were randomized to 18-min of manual or mechanical CCs. Changes in AOI and right atrial pressure (ΔRAP) were recorded during CCs in animals undergoing manual (n = 6) or mechanical (n = 6) CCs. Lung CT scan and measurement of the respiratory system compliance (Cpl,rs) were performed immediately after return of spontaneous circulation. RESULTS: Animals undergoing mechanical CCs had a lower AOI compared to animals treated with manual CCs ($p < 0.001$). AOI negatively correlated with the swings of intrathoracic pressure, as measured by the change in ΔRAP ($\rho=-0.727$, $p = 0.007$). AOI correlated with the lung density ($\rho=-0.818$, $p = 0.001$) and with the Cpl,rs ($\rho = 0.676$, $p = 0.016$). Animals with cardiopulmonary resuscitation associated lung edema (CRALE) (i.e. mean CT≥-500 HU) showed lower levels of AOI compared to animals without it (29 ± 12% versus 50 ± 16%, $p = 0.025$). CONCLUSIONS: Animals undergoing mechanical CCs had lower levels of AOI compared to animals undergoing manual CCs. A higher swing of intrathoracic pressure during CC, a denser and a stiffer lung were associated with an impaired CO2 exhalation during CC as observed by a lower AOI.

CASE REPORTS

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Medular ischemia after cardiac arrest.

Lozano Gómez H(1), Isern de Val I(1), Zalba Etayo B(1).

NO ABSTRACT AVAILABLE

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NO ABSTRACT AVAILABLE