This week's PubMed 14th – 20th May 2023: articles of interest n = 66

CPR AND COVID-19

1. BMC Emerg Med. 2023 May 15;23(1):48. doi: 10.1186/s12873-023-00820-y.
Impact of COVID-19-adapted guidelines using different airway management strategies on resuscitation quality in out-of-hospital-cardiac-arrest - a randomised manikin study.
Scholz SS(1), Linder S(2), Latka E(3), Bartnick T(3), Karla D(3), Thaemel D(3), Wolff M(3), Sauzet O(4), Rehberg SW(1), Thies KC(1), Jansen G(5)(6)(7).
ABSTRACT
BACKGROUND: Although airway management for paramedics has moved away from endotracheal intubation towards extraglottic airway devices in recent years, in the context of COVID-19, endotracheal intubation has seen a revival. Endotracheal intubation has been recommended again under the assumption that it provides better protection against aerosol liberation and infection risk for care providers than extraglottic airway devices accepting an increase in no-flow time and possibly worsen patient outcomes. METHODS: In this manikin study paramedics performed advanced cardiac life support with non-shockable (Non-VF) and shockable rhythms (VF) in four settings: ERC guidelines 2021 (control), COVID-19-guidelines using videolaryngoscopic intubation (COVID-19-intubation), laryngeal mask (COVID-19-Laryngeal-Mask) or a modified laryngeal mask modified with a shower cap (COVID-19-showercap) to reduce aerosol liberation simulated by a fog machine. Primary endpoint was no-flow-time, secondary endpoints included data on airway management as well as the participants' subjective assessment of aerosol release using a Likert-scale (0 = no release-10 = maximum release) were collected and statistically compared. Continuous Data was presented as mean ± standard deviation. Interval-scaled Data were presented as median and Q1 and Q3. RESULTS: A total of 120 resuscitation scenarios were completed. Compared to control (Non-VF:11 ± 3 s, VF:12 ± 3 s) application of COVID-19-adapted guidelines lead to prolonged no-flow times in all groups (COVID-19-Intubation: Non-VF:17 ± 11 s, VF:19 ± 5 s;$p \leq 0.001$; COVID-19-laryngeal-mask: VF:15 ± 5 s,$p \leq 0.01$; COVID-19-showercap: VF:15 ± 3 s,$p \leq 0.01$). Compared to COVID-19-Intubation, the use of the laryngeal mask and its modification with a showercap both led to a reduction of no-flow-time(COVID-19-laryngeal-mask: Non-VF:$p = 0.002$;VF:$p \leq 0.001$; COVID-19-Showercap: Non-VF:$p \leq 0.001$;VF:$p = 0.002$) due to a reduced duration of intubation (COVID-19-Intubation: Non-VF:40 ± 19 s;VF:33 ± 17 s; both $p \leq 0.01$ vs. control, COVID-19-Laryngeal-Mask (Non-VF:15 ± 7 s;VF:13 ± 5 s;$p > 0.05$) and COVID-19-Shower-cap (Non-VF:15 ± 5 s;VF:17 ± 5 s;$p > 0.05$). The participants rated aerosol liberation lowest in COVID-19-intubation (median:0;Q1:0,Q3:2; $p < 0.001$vs.COVID-19-laryngeal-mask and COVID-19-showercap) compared to COVID-19-shower-cap (median:3;Q1:1,Q3:3 $p < 0.001$vs.COVID-19-laryngeal-mask) or COVID-19-laryngeal-mask (median:9;Q1:6,Q3:8). CONCLUSIONS: COVID-19-adapted guidelines using videolaryngoscopic intubation lead to a prolongation of no-flow time. The use of a modified laryngeal mask with a shower cap seems to be a suitable compromise combining minimal impact on no-flowtime and reduced aerosol exposure for the involved providers.

2. Open Access Emerg Med. 2023 May 9;15:157-164. doi: 10.2147/OAEM.S411096. eCollection 2023.
Effect of Contact-Restricted Basic Life Support Training During the Nation's Contact Restriction Policy on Learning Outcomes.
Boonmak S(1), Boonmak P(1).
ABSTRACT

OBJECTIVE: Basic life support (BLS) training aimed at building knowledge and skills in cardiopulmonary resuscitation. During training, there is the possibility of airborne COVID-19 transmission. The aim was to evaluate students' knowledge, skills, and course satisfaction following contact-restricted BLS training under the contact restriction policy. METHODS: From July 2020 to January 2021, a prospective, descriptive study was conducted among fifth-year dental students. Contact-restricted BLS training consisted of online learning, online pre-testing, non-contact training with automated real-time feedback manikins, and remote monitoring. The participants' skills, knowledge through online testing, and course satisfaction were all evaluated after training. At three months and six months after training, their knowledge was re-evaluated through online testing. RESULTS: Fifty-five participants were included in this study. Their mean (SD) knowledge scores after training, at three and six months, were 81.5 (10.8)%, 71.1 (16.4)%, and 65.8 (14.5)%, respectively. The percentage of participants, who passed the skills test on their first, second, and third attempts had been 83.6%, 94.5%, and 100%, respectively. The mean (SD) satisfaction score with the course was 4.87 (0.34) on a five-point Likert score. After training, no participants had COVID-19 infection. CONCLUSION: Training in contact-restricted BLS had produced acceptable knowledge, skills, and satisfaction results. Knowledge tests, competence tests, and course satisfaction were comparable to conventional pre-pandemic trainings with similar participants. Due to the significant dangers of aerosol disease transmission, it became a viable training alternative.

CPR/MECHANICAL CHEST COMPRESSION

1. J Emerg Trauma Shock. 2023 Jan-Mar;16(1):31-32. doi: 10.4103/jets.jets_119_22. Epub 2023 Mar 24.

Direct versus Video Laryngoscopy during Simulated Mechanical Chest Compressions: A Randomized Crossover Trial.

Roberts A(1), Herrick J(1), Xu KT(2), Richman P(1).

NO ABSTRACT AVAILABLE

REGISTRIES, REVIEWS AND EDITORIALS

1. Eur Heart J Acute Cardiovasc Care. 2023 May 20:zuad053. doi: 10.1093/ehjacc/zuad053. Online ahead of print.

Poorer Survival after Out-of-Hospital Cardiac Arrest among Cancer Patients - A Population-Based Register Study.

Hägglund HL(1), Jonsson M(2), Hedayati E(3), Hedman C(4), Djärv T(1).

ABSTRACT

BACKGROUND AND AIMS: The association between cancer and survival after out-of-hospital cardiac arrest (OHCA) has not been thoroughly investigated. We aimed to address this knowledge gap using national, population-based registries. METHODS: For this study, 30,163 OHCA patients (≥18 years) were included from the Swedish Register of Cardiopulmonary Resuscitation. Via linkage to the National Patient Registry, 2,894 patients (10%) with cancer diagnosed within 5 years prior to OHCA were identified. Differences in 30-day survival between cancer patients and controls (defined as OHCA patients without previous cancer diagnosis) were assessed related to cancer stage (locoregional vs metastasized cancer) and cancer site (i.e. lung cancer, breast cancer etc.) using logistic regression adjusted for prognostic factors. Long-term survival is presented as a Kaplan-Meier curve. RESULTS: For locoregional cancer no statistically significant difference in return of spontaneous circulation (ROSC) was seen compared to controls, metastasized disease was

associated with poorer chance of ROSC. Cancer was associated with lower 30-day survival for all cancers (Adjusted odds ratio, OR, 0.57, CI 0.49-0.66), locoregional cancer (Adjusted OR 0.68, CI 0.57-0.82) and metastasized cancer (Adjusted OR 0.24, CI 0.14-0.40) compared to controls. Lower 30-day survival compared to controls was seen for lung cancer, gynaecological and haematological cancers. CONCLUSION: Cancer is associated with poorer 30-day survival after OHCA. This study suggests that cancer site and disease stage are more relevant factors than cancer in general with regard to its effect on survival after OHCA.

2. Cureus. 2023 Apr 9;15(4):e37350. doi: 10.7759/cureus.37350. eCollection 2023 Apr.
A Review of CPR Augmentation Devices.
Bengio M(1), Goodwin G(2), Scumpia A(3).
ABSTRACT
The study aims to assess cardiopulmonary resuscitation (CPR) outcomes in cardiac arrest patients when using CPR augmentation devices, such as the ZOLL ResQCPR system (Chelmsford, MA) or its components ResQPUMP and ResQPOD, which are manual active compression-decompression (ACD) device and impedance threshold device (ITD), respectively. The analysis included a Google Scholar-based literature review that took place between January 2015 and March 2023 and included recent publications with PubMed IDs or widely cited articles to assess the effectiveness of the ResQPUMP and ResQPOD or similar devices. This review also includes studies quoted by ZOLL, but those were not considered in our conclusion since the authors were employed by ZOLL. We found that in a study on human cadavers, the force of decompression increased the chest compliance of the chest wall by 30%-50% ($p<0.05$). Essentially, active compression-decompression improved the return of spontaneous circulation (ROSC) with meaningful neurologic outcomes by 50% in a blinded, randomized, and controlled human trial ($n=1,653$; $p<0.02$). The main study on the ResQPOD had a controversial human data pool with one randomized and controlled study arguing for no significant difference with or without the device ($n=8,718$; $p=0.71$). However, a post hoc analysis and the reorganization of the data by CPR quality demonstrated significance (n decreased to 2,799, reported in odds ratio without specific p-values). In conclusion to the limited number of studies presented, any manual ACD device is a great alternative to standard cardiopulmonary resuscitation regarding survivability with good neurologic function and should be utilized in prehospital emergency medical services and hospital emergency departments. ITDs are still controversial but promising with more future data.

3. CJEM. 2023 May;25(5):376-377. doi: 10.1007/s43678-023-00501-6. Epub 2023 Apr 23.
Does targeting a higher versus lower MAP improve survival following out-of-hospital cardiac arrest?
Wudwud A(1), Hendin A(2), Perry J(3).
NO ABSTRACT AVAILABLE

4. Clin Sports Med. 2023 Jul;42(3):355-371. doi: 10.1016/j.csm.2023.02.003. Epub 2023 Apr 7.
Cardiac Emergency in the Athlete.
Denq W(1), Oshlag B(2).
ABSTRACT
Cardiac-related deaths are the leading nontraumatic cause of death in the young athlete. Although there are multiple causes for cardiac arrest in athletes, sideline evaluation and management does not vary. Recognition, immediate high-quality chest compressions, and time to defibrillation are the greatest factors affecting survival. This article reviews the approach to the collapsed athlete, causes

for select cardiac emergencies in athletes, preparedness for cardiac emergencies, and return to play considerations and recommendations.

5. Crit Care Med. 2023 Jun 1;51(6):e134-e135. doi: 10.1097/CCM.0000000000005857. Epub 2023 May 18.
What Is the True Meaning of a "Good" Pediatric Cerebral Performance Category Score at Hospital Discharge in Pediatric Cardiac Arrest Survivors?
Albrecht M(1), Dulfer K, Hunfeld M, de Jonge RCJ, Buysse CMP.
NO ABSTRACT AVAILABLE

6. J Am Coll Cardiol. 2023 May 23;81(20):e173. doi: 10.1016/j.jacc.2023.03.408.
Reply: Uncovering Risk Factors for In-Hospital Cardiac Arrest in ST-Segment Elevation Myocardial Infarction.
Gong W, Yan Y, Montalescot G, Nie S.
NO ABSTRACT AVAILABLE

7. N Engl J Med. 2023 May 18;388(20):1916-1917. doi: 10.1056/NEJMc2302405.
Extracorporeal CPR for Out-of-Hospital Cardiac Arrest. Reply.
Suverein MM(1), Lorusso R(1), van de Poll MCG(1).
NO ABSTRACT AVAILABLE

8. N Engl J Med. 2023 May 18;388(20):1915-1916. doi: 10.1056/NEJMc2302405.
Extracorporeal CPR for Out-of-Hospital Cardiac Arrest.
Cho SM(1), Geocadin R(1), Whitman GJ(1).
NO ABSTRACT AVAILABLE

9. N Engl J Med. 2023 May 18;388(20):1915. doi: 10.1056/NEJMc2302405.
Extracorporeal CPR for Out-of-Hospital Cardiac Arrest.
Pollari F(1), Cuomo M(2).
NO ABSTRACT AVAILABLE

10. N Engl J Med. 2023 May 18;388(20):1914-1915. doi: 10.1056/NEJMc2302405.
Extracorporeal CPR for Out-of-Hospital Cardiac Arrest.
Teixeira JP(1), Kraai E(1), Wray TC(1).
NO ABSTRACT AVAILABLE

11. N Engl J Med. 2023 May 18;388(20):1914. doi: 10.1056/NEJMc2302405.
Extracorporeal CPR for Out-of-Hospital Cardiac Arrest.
Lamhaut L(1), Ihle J(2), Hutin A(3).
NO ABSTRACT AVAILABLE

12. N Engl J Med. 2023 May 18;388(20):1913-1914. doi: 10.1056/NEJMc2302405.
Extracorporeal CPR for Out-of-Hospital Cardiac Arrest.
Manintveld OC(1), Roest S(1), Taverne YJHJ(1).
NO ABSTRACT AVAILABLE

13. J Neurosurg Anesthesiol. 2023 May 16. doi: 10.1097/ANA.0000000000000921. Online ahead of print.

Post-Cardiac Arrest Syndrome.
Penketh J(1), Nolan JP(1)(2).
ABSTRACT
Post-cardiac arrest syndrome (PCAS) is a multicomponent entity affecting many who survive an initial period of resuscitation following cardiac arrest. This focussed review explores some of the strategies for mitigating the effects of PCAS following the return of spontaneous circulation. We consider the current evidence for controlled oxygenation, strategies for blood-pressure targets, the timing of coronary reperfusion, and the evidence for temperature control and treatment of seizures. Despite several large trials investigating specific strategies to improve outcomes after cardiac arrest, many questions remain unanswered. Results of some studies suggest that interventions may benefit specific subgroups of cardiac arrest patients, but the optimal timing and duration of many interventions remain unknown. The role of intracranial pressure monitoring has been the subject of only a few studies, and its benefits remain unclear. Research aimed at improving the management of PCAS is ongoing.

14. Crit Care. 2023 May 15;27(1):187. doi: 10.1186/s13054-023-04462-1.
Confounding factors in article stating that Ubiquitin C terminal hydrolase predicts poor neurological outcome after cardiac arrest.
Honoré PM(1), Perriens E(2), Bousbiat I(2), Harim N(3), Germain E(3), El Nawar P(3), Blackman S(2).
NO ABSTRACT AVAILABLE

15. ESC Heart Fail. 2023 Jun;10(3):1555-1569. doi: 10.1002/ehf2.14248. Epub 2022 Dec 9.
Are arrhythmias the drivers of sudden cardiac death in heart failure with preserved ejection fraction? A review.
Yuyun MF(1)(2)(3)(4), Kinlay S(1)(2)(3)(4), Singh JP(2)(5), Joseph J(1)(2)(4).
ABSTRACT
In patients with heart failure with preserved ejection fraction (HFpEF), sudden cardiac death (SCD) accounts for approximately 25-30% of all-cause mortality and 40% of cardiovascular mortality in properly adjudicated large clinical trials. The mechanism of SCD in HFpEF remains unknown but thought to be driven by arrhythmic events. Apart from atrial fibrillation, which is prevalent in approximately 45% of HFpEF patients, the true burden of other cardiac arrhythmias in HFpEF remains undetermined. The incidence and risk of clinically significant advanced cardiac conduction disease with bradyarrhythmias and ventricular arrhythmias remain less known. Recommendations have been made for long-term cardiac rhythm monitoring to determine the incidence of arrhythmias and clarify mechanisms and mode of death in HFpEF patients. In animal studies, spontaneous ventricular arrhythmias and SCD are significantly elevated in HFpEF animals compared with controls without heart failure. In humans, these studies are scant, with a few published small-size studies suggesting an increased incidence of ventricular arrhythmias in HFpEF. Higher rates of clinically significant conduction disease and cardiac pacing are seen in HFpEF compared with the general population. Excepting atrial fibrillation, the predictive effect of other arrhythmias on heart failure hospitalization, all-cause mortality, and precisely SCD remains unknown. Given the high occurrence of SCD in the HFpEF population, it could potentially become a target for therapeutic interventions if driven by arrhythmias. Studies to address these knowledge gaps are urgently warranted. In this review, we have summarized data on arrhythmias and SCD in HFpEF while highlighting avenues for future research in this area.

16. Am J Emerg Med. 2023 Jun;68:198. doi: 10.1016/j.ajem.2023.04.011. Epub 2023 Apr 11.

Comment on: Association between prehospital airway type and oxygenation and ventilation in out-of-hospital cardiac arrest.
Jouffroy R(1), Vivien B(2).
NO ABSTRACT AVAILABLE

17. Resusc Plus. 2023 May 8;14:100392. doi: 10.1016/j.resplu.2023.100392. eCollection 2023 Jun.
Why the Norwegian 2021 guideline for basic life support are different.
Bjørshol CA(1)(2)(3), Nordseth T(4)(5), Kramer-Johansen J(6)(7).
NO ABSTRACT AVAILABLE

18. Am J Emerg Med. 2023 May 3:S0735-6757(23)00228-0. doi: 10.1016/j.ajem.2023.04.038. Online ahead of print.
The authors reply: mechanical vs manual chest compression.
Hayashi M(1), Tanizaki S(2).
NO ABSTRACT AVAILABLE

19. Am J Emerg Med. 2023 May 6:S0735-6757(23)00226-7. doi: 10.1016/j.ajem.2023.04.043. Online ahead of print.
Is mechanical CPR safe and effective?
Rottenberg EM(1).
NO ABSTRACT AVAILABLE

20. Am J Emerg Med. 2023 Jun;68:191-192. doi: 10.1016/j.ajem.2023.04.019. Epub 2023 Apr 21.
Use of head rotation during bystander CPR to minimize time to recognition of cardiac arrest.
Rottenberg EM.
NO ABSTRACT AVAILABLE

IN-HOSPITAL CARDIAC ARREST

1. J Am Coll Cardiol. 2023 May 23;81(20):e171. doi: 10.1016/j.jacc.2023.01.050.
Uncovering Risk Factors for In-Hospital Cardiac Arrest in ST-Segment Elevation Myocardial Infarction.
Kuno T, Kohsaka S.
NO ABSTRACT AVAILABLE

INJURIES AND CPR

1. Acute Med Surg. 2023 May 17;10(1):e845. doi: 10.1002/ams2.845. eCollection 2023 Jan-Dec.
Delayed massive bleeding from minor splenic injury due to mechanical chest compression for cardiopulmonary resuscitation.
Yamada T(1), Nakao S(1), Fukuma H(1), Matsuoka T(1).
ABSTRACT
BACKGROUND: Splenic injury due to chest compressions is a rare and fatal complication that occurs immediately after cardiopulmonary resuscitation. CASE PRESENTATION: Cardiopulmonary resuscitation was carried out using a mechanical chest compression device in a 74-year-old Japanese female patient who underwent cardiac arrest. Computed tomography postresuscitation revealed bilateral anterior rib fractures. Other traumatic findings were not observed. Coronary angiography revealed no new lesions; the cause of the arrest was hypokalemia. She received mechanical support

with venoarterial extracorporeal membrane oxygenation and multiple antithrombotic agents. Her hemodynamic and coagulative condition became life-threatening on day 4; abdominal ultrasound revealed massive bloody ascites. Only a minor splenic laceration was observed intraoperatively, despite massive bleeding. Furthermore, her condition stabilized after splenectomy and blood transfusion. Venoarterial extracorporeal membrane oxygenation was discontinued on day 5. CONCLUSION: In patients with postcardiac arrest, delayed bleeding due to minor visceral injury should be considered, particularly for coagulation abnormalities.

CAUSE OF THE ARREST

1. Sci Rep. 2023 May 16;13(1):7905. doi: 10.1038/s41598-023-35024-8.
Effect of end-stage kidney disease on the return of spontaneous circulation in Taiwanese adults with out-of-hospital cardiac arrest.
Hsieh MS(1)(2)(3)(4), Chattopadhyay A(5), Lu TP(6), Liao SH(7), Chang CM(2)(3)(8), Lee YC(1), Lo WE(1), Wu JJ(9), Hsieh VC(10), Hu SY(#)(4)(11)(12)(13), How CK(#)(14)(15).
ABSTRACT
Rescuing patients with out-of-hospital cardiac arrest (OHCA), especially those with end-stage kidney disease (ESKD), is challenging. This study hypothesizes that OHCA patients with ESKD undergoing maintenance hemodialysis have (1) higher rates of return of spontaneous circulation (ROSC) during cardio-pulmonary resuscitation (CPR) and (2) lower rates of hyperkalemia and less severe acidosis than those without ESKD. OHCA patients who received CPR between 2011 and 2020 were dichotomized into ESKD and non-ESKD groups. The association of ESKD with "any" and "sustained" ROSC were examined using logistic regression analysis. Furthermore, the effect of ESKD on hospital outcomes for OHCA patients who survived to admission was evaluated using Kaplan-Meier analysis. ESKD patients without "any" ROSC displayed lower potassium and higher pH levels than non-ESKD patients. ESKD was positively associated with "any" ROSC (adjusted-OR: 4.82, 95% CI 2.70-5.16, $P < 0.01$) and "sustained" ROSC (adjusted-OR: 9.45, 95% CI 3.83-24.13, $P < 0.01$). Kaplan-Meier analysis demonstrated ESKD patients had a non-inferior hospital survival than non-ESKD patients. OHCA patients with ESKD had lower serum potassium level and less severe acidosis compared to the general population in Taiwan; therefore, should not be treated under the stereotypical assumption that hyperkalemia and acidosis always occur.

2. BMJ Open. 2023 May 15;13(5):e066743. doi: 10.1136/bmjopen-2022-066743.
Ambient air pollution and emergency department visits and hospitalisation for cardiac arrest: a population-based case-crossover study in Reykjavik, Iceland.
Halldorsdottir S(1), Finnbjornsdottir RG(2), Elvarsson BT(3), Gunnarsdottir OS(4), Gudmundsson G(5), Rafnsson V(6).
ABSTRACT
OBJECTIVES: To assess the association between traffic-related ambient air pollution and emergency hospital visits for cardiac arrest. DESIGN: Case-crossover design was used with a lag time to 4 days. SETTING: The Reykjavik capital area and the study population was the inhabitants 18 years and older identified by encrypted personal identification numbers and zip codes. PARTICIPANTS AND EXPOSURE: Cases were those with emergency visits to Landspitali University Hospital during the period 2006-2017 and who were given the primary discharge diagnosis of cardiac arrest according to the International Classification of Diseases 10th edition (ICD-10) code I46. The pollutants were nitrogen dioxide (NO_2), particulate matter with aerodynamic diameter less than 10 µm (PM_{10}), particulate matter with aerodynamic diameter less than 2.5 µm ($PM_{2.5}$) and sulfur dioxide (SO_2) with adjustment for hydrogen sulfide (H_2S), temperature and relative humidity. MAIN OUTCOME

MEASURE: OR and 95% CIs per 10 µg/m3 increase in concentration of pollutants. RESULTS: The 24-hour mean NO2 was 20.7 µg/m3, mean PM10 was 20.5 µg/m3, mean PM2.5 was 12.5 µg/m3 and mean SO2 was 2.5 µg/m3. PM10 level was positively associated with the number of emergency hospital visits (n=453) for cardiac arrest. Each 10 µg/m3 increase in PM10 was associated with increased risk of cardiac arrest (ICD-10: I46), OR 1.096 (95% CI 1.033 to 1.162) on lag 2, OR 1.118 (95% CI 1.031 to 1.212) on lag 0-2, OR 1.150 (95% CI 1.050 to 1.261) on lag 0-3 and OR 1.168 (95% CI 1.054 to 1.295) on lag 0-4. Significant associations were shown between exposure to PM10 on lag 2 and lag 0-2 and increased risk of cardiac arrest in the age, gender and season strata. CONCLUSIONS: A new endpoint was used for the first time in this study: cardiac arrest (ICD-10 code: I46) according to hospital discharge registry. Short-term increase in PM10 concentrations was associated with cardiac arrest. Future ecological studies of this type and their related discussions should perhaps concentrate more on precisely defined endpoints.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

No articles identified.

TRAUMA

1. Am J Emerg Med. 2023 Jun;68:28-32. doi: 10.1016/j.ajem.2023.02.034. Epub 2023 Mar 1.
CAB versus ABC approach for resuscitation of patients following traumatic injury: Toward improving patient safety and survival.
Breeding T(1), Martinez B(1), Katz J(1), Kim J(1), Havron W(2), Hoops H(3), Elkbuli A(4).
ABSTRACT
INTRODUCTION: Though a circulation-airway-breathing (CAB) resuscitation sequence is now widely accepted in administering CPR over the airway-breathing-circulation (ABC) sequence following cardiac arrest, current evidence and guidelines vary considerably for complex polytraumas, with some prioritizing management of the airway and others advocating for initial treatment of hemorrhage. This review aims to evaluate existing literature comparing ABC and CAB resuscitation sequences in adult trauma patients in-hospital to direct future research and guide evidence-based recommendations for management. METHODS: A literature search was conducted on PubMed, Embase, and Google Scholar until September 29, 2022. Articles were assessed for comparison between CAB and ABC resuscitation sequences, adult trauma patients, in-hospital treatment,

patient volume status, and clinical outcomes. RESULTS: Four studies met the inclusion criteria. Two studies compared the CAB and ABC sequences specifically in hypotensive trauma patients, one study evaluated the sequences in trauma patients with hypovolemic shock, and one study in patients with all types of shock. Hypotensive trauma patients who underwent rapid sequence intubation before blood transfusion had a significantly higher mortality rate than those who had blood transfusion initiated first (50 vs 78% $P < 0.05$) and a significant drop in blood pressure. Patients who subsequently experienced post-intubation hypotension (PIH) had increased mortality over those without PIH. overall mortality was higher in patients that developed PIH (mortality, n (%): PIH = 250/753 (33.2%) vs 253/1291 (19.6%), $p < 0.001$). CONCLUSION: This study found that hypotensive trauma patients, especially those with active hemorrhage, may benefit more from a CAB approach to resuscitation, as early intubation may increase mortality secondary to PIH. However, patients with critical hypoxia or airway injury may still benefit more from the ABC sequence and prioritization of the airway. Future prospective studies are needed to understand the benefits of CAB with trauma patients and identify which patient subgroups are most affected by prioritizing circulation before airway management.

VENTILATION

No articles identified.

CERERBRAL MONITORING

1. J Clin Monit Comput. 2023 May 17. doi: 10.1007/s10877-023-01008-2. Online ahead of print.
Are NIRS-derived cerebral autoregulation and ABPopt values different between hemispheres in hypoxic-ischemic brain injury patients following cardiac arrest?
Hazenberg L(1), Aries M(2)(3), Beqiri E(4), Mess WH(5), van Mook W(2)(6)(7), Delnoij T(2)(8), Zeiler FA(9)(10)(11)(12)(13), van Kuijk S(14), Tas J(2)(3).

ABSTRACT
PURPOSE: Near-infrared spectroscopy (NIRS) has been suggested as a non-invasive monitoring technique to set cerebral autoregulation (CA) guided ABP targets (ABPopt) in comatose patients with hypoxic-ischemic brain injury (HIBI) following cardiac arrest. We aimed to determine whether NIRS-derived CA and ABPopt values differ between left and right-sided recordings in these patients. METHODS: Bifrontal regional oxygen saturation (rSO2) was measured using INVOS or Fore-Sight devices. The Cerebral Oximetry index (COx) was determined as a CA measure. ABPopt was calculated using a published algorithm with multi-window weighted approach. A paired Wilcoxon signed rank test and intraclass correlation coefficients (ICC) were used to compare (1) systematic differences and (2) degree of agreement between left and right-sided measurements. RESULTS: Eleven patients were monitored. In one patient there was malfunctioning of the right-sided optode and in one patient not any ABPopt value was calculated. Comparison of rSO2 and COx was possible in ten patients and ABPopt in nine patients. The average recording time was 26 (IQR, 22-42) hours. The ABPopt values were not significantly different between the bifrontal recordings (80 (95%-CI 76-84) and 82 (95%-CI 75-84) mmHg) for the left and right recordings, $p = 1.0$). The ICC for ABPopt was high (0.95, 0.78-0.98, $p < 0.001$). Similar results were obtained for rSO2 and COx. CONCLUSION: We found no differences between left and right-sided NIRS recordings or CA estimation in comatose and ventilated HIBI patients. This suggests that in these patients without signs of localized pathology unilateral recordings might be sufficient to estimate CA status or provide ABPopt targets.

ULTRASOUND AND CPR

1. Scand J Trauma Resusc Emerg Med. 2023 May 20;31(1):24. doi: 10.1186/s13049-023-01077-x.
Resuscitative transesophageal echocardiography in the emergency department: a single-centre case series.
Kegel F(1), Chenkin J(2)(3).

ABSTRACT
BACKGROUND: Transesophageal echocardiography (TEE) is an emerging tool that can aid emergency physicians in treating patients in cardiac arrest and undifferentiated shock. TEE can aid in diagnosis, resuscitation, identify cardiac rhythms, guide chest compression vectors, and shorten sonographic pulse checks. This study evaluated the proportion of patients who underwent a change in their resuscitation management as a result of emergency department resuscitative TEE. METHODS: This was a single-centre case series of 25 patients who underwent ED resuscitative TEE from 2015 to 2019. The objective of this study is to evaluate the feasibility and clinical impact of resuscitative TEE in critically ill patients in the emergency department. Data including changes in working diagnosis, complications, patient disposition, and survival to hospital discharge were also collected. RESULTS: 25 patients (median age 71, 40% female) underwent ED resuscitative TEE. All patients were intubated prior to probe insertion and adequate TEE views were obtained for every patient. The most common indications for resuscitative TEE were cardiac arrest (64%) and undifferentiated shock (28%). Resuscitation management changed in 76% (N = 19) and working diagnosis changed in 76% (N = 19) of patients. Ten patients died in the ED, 15 were admitted to hospital, and eight survived to hospital discharge. There were no immediate complications (0/15) and two delayed complications (2/15), both of which were minor gastrointestinal bleeding. CONCLUSIONS: The use of ED resuscitative TEE is a practical modality that provides useful diagnostic and therapeutic information for critically ill patients in the emergency department, with an excellent rate of adequate cardiac visualization, and a low complication rate.

ORGANISATION AND TRAINING

1. J Pediatr (Rio J). 2023 May 18:S0021-7557(23)00058-X. doi: 10.1016/j.jped.2023.04.006. Online ahead of print.
Impact of resuscitation training program on neonatal outcomes in a region of high socioeconomic vulnerability in Brazil: an interventional study.
Lima RO(1), Marba STM(2), Almeida MFB(3), Guinsburg R(3).

ABSTRACT
OBJECTIVES: This pre/post-intervention study aimed to evaluate neonatal outcomes after the implementation of the Neonatal Resuscitation Program of the Brazilian Society of Pediatrics. METHOD: This interventional study was conducted across five secondary healthcare regions that supported 62 cities in the southwestern mesoregion of Piauí. It included 431 healthcare professionals responsible for neonatal care in the study region. The participants were trained in neonatal resuscitation through the Neonatal Resuscitation Program of the Brazilian Society of Pediatrics. Delivery room structuring, healthcare professionals' knowledge, and neonatal care outcomes were analyzed immediately before and after intervention and after 12 months between February 2018 and March 2019, and healthcare professionals were evaluated. RESULTS: Training was conducted for over 106 courses. As a participant could take multiple courses, 700 training sessions were conducted. Regarding delivery room structuring, the acquisition of materials required for resuscitation increased from 28.4 to 80.6% immediately after the intervention and to 83.3% after

12 months. Knowledge retention was significant in the post-training period, with a 95.5% approval rate, and knowledge acquisition was satisfactory after 12 months. The number of newborns transferred during the study period increased significantly. A 72.6% reduction in mortality at birth was recorded, and 479 newborns were resuscitated. CONCLUSION: Following the implementation of the Neonatal Resuscitation Program of the Brazilian Society of Pediatrics, structural improvements in delivery rooms, adequate knowledge retention regarding neonatal resuscitation, and a consequent reduction in neonatal mortality were observed.

2. JAMA Netw Open. 2023 May 1;6(5):e2313969. doi: 10.1001/jamanetworkopen.2023.13969.
Comparison of Resuscitation Quality in Simulated Pediatric and Adult Out-of-Hospital Cardiac Arrest.
Hansen M(1), Walker-Stevenson G(2), Bahr N(2), Harrod T(2), Meckler G(3), Eriksson C(4), Guise JM(5).

ABSTRACT
IMPORTANCE: Mortality from pediatric out-of-hospital cardiac arrest (OHCA) is high and has not improved in decades, unlike adult mortality. The low frequency of pediatric OHCA and weight-based medication and equipment needs may lead to lower quality of pediatric resuscitation compared with adults. OBJECTIVE: To compare the quality of pediatric and adult resuscitation from OHCA in a controlled simulation environment and to evaluate whether teamwork, knowledge, experience, and cognitive load are associated with resuscitation performance. DESIGN, SETTING, AND PARTICIPANTS: This cross-sectional in-situ simulation study was conducted between September 2020 and August 2021 in the metropolitan area of Portland, Oregon, and included engine companies from fire-based emergency services (EMS) agencies. EXPOSURES: Participating EMS crews completed 4 simulation scenarios presented in random order: (1) adult female with ventricular fibrillation; (2) adult female with pulseless electrical activity; (3) school-aged child with ventricular fibrillation; and (4) infant with pulseless electrical activity. All patients were pulseless on EMS arrival. Data were captured by the research team in real time during the scenarios. MAIN OUTCOMES AND MEASURES: The primary outcome was defect-free care, which included correct cardiopulmonary resuscitation depth, rate, and compression to ventilation ratio, time to bag-mask ventilation, and time to defibrillation, if applicable. Outcomes were determined by direct observation by an experienced physician. Secondary outcomes included additional time-based interventions and the use of correct medication doses and equipment size. We measured teamwork using the clinical teamwork scale, cognitive load with the National Aeronautics and Space Administration task load index (NASA-TLX), and knowledge using advanced life support resuscitation tests. RESULTS: Among the 215 clinicians (39 crews) who participated in 156 simulations, 200 (93%) were male, and the mean (SD) age was 38.7 (0.6) years. No pediatric shockable scenario was defect free and only 5 pediatric nonshockable scenarios (12.8%) were defect free, while 11 (28.2%) adult shockable scenarios and 27 adult nonshockable scenarios (69.2%) were defect free. The mental demand subscale of the NASA-TLX was higher in the pediatric compared with the adult scenarios (mean [SD] pediatric score, 59.1 [20.7]; mean [SD] adult score, 51.4 [21.1]; P = .01). Teamwork scores were not associated with defect-free care. CONCLUSIONS AND RELEVANCE: In this simulation study of OHCA, resuscitation quality was significantly lower for pediatric than adult resuscitation. Mental demand may have been a contributor.

3. Circulation. 2023 May 17. doi: 10.1161/CIR.0000000000001128. Online ahead of print.
KIDS SAVE LIVES: Basic Life Support Education for Schoolchildren: A Narrative Review and Scientific Statement From the International Liaison Committee on Resuscitation.

Schroeder DC, Semeraro F, Greif R, Bray J, Morley P, Parr M, Kondo Nakagawa N, Iwami T, Finke SR, Malta Hansen C, Lockey A, Del Rios M, Bhanji F, Sasson C, Schexnayder SM, Scquizzato T, Wetsch WA, Böttiger BW; International Liaison Committee on Resuscitation.

ABSTRACT

BACKGROUND: Basic life support education for schoolchildren has become a key initiative to increase bystander cardiopulmonary resuscitation rates. Our objective was to review the existing literature on teaching schoolchildren basic life support to identify the best practices to provide basic life support training in schoolchildren. METHODS: After topics and subgroups were defined, a comprehensive literature search was conducted. Systematic reviews and controlled and uncontrolled prospective and retrospective studies containing data on students <20 years of age were included. RESULTS: Schoolchildren are highly motivated to learn basic life support. The CHECK-CALL-COMPRESS algorithm is recommended for all schoolchildren. Regular training in basic life support regardless of age consolidates long-term skills. Young children from 4 years of age are able to assess the first links in the chain of survival. By 10 to 12 years of age, effective chest compression depths and ventilation volumes can be achieved on training manikins. A combination of theoretical and practical training is recommended. Schoolteachers serve as effective basic life support instructors. Schoolchildren also serve as multipliers by passing on basic life support skills to others. The use of age-appropriate social media tools for teaching is a promising approach for schoolchildren of all ages. CONCLUSIONS: Schoolchildren basic life support training has the potential to educate whole generations to respond to cardiac arrest and to increase survival after out-of-hospital cardiac arrest. Comprehensive legislation, curricula, and scientific assessment are crucial to further develop the education of schoolchildren in basic life support.

4. Resuscitation. 2023 May 17:109772. doi: 10.1016/j.resuscitation.2023.109772. Online ahead of print.

KIDS SAVE LIVES: Basic Life Support Education for Schoolchildren: A Narrative Review and Scientific Statement From the International Liaison Committee on Resuscitation.

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ABSTRACT

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hospital cardiac arrest. Comprehensive legislation, curricula, and scientific assessment are crucial to further develop the education of schoolchildren in basic life support.

5. Emerg Med Int. 2023 May 5;2023:8150697. doi: 10.1155/2023/8150697. eCollection 2023.
Association of Training in Basic Life Support with the Evolution of Cardiopulmonary Resuscitation Performed by Firefighters.
Donizeti Silva M(1), Augusto Barbieri R(2), Figueiredo Foresti Y(2), Augusto Cursiol J(2), Antônio Viana F(3), Fernando Dos Santos E(3), Pereira Rodrigues K(4), da Silva Rodrigues G(4), da Silva Garcia Nascimento J(1), Barcellos Dalri MC(1).
ABSTRACT
INTRODUCTION: This study aimed to compare the results of professional technical and anthropometric anamnesis data with the transmission of external chest compressions performed by military firefighters at different execution times. OBJECTIVE: The objective was to evaluate the performance and perceived effort of the sequence of external chest compressions performed in two minutes, as well as the evolution of the technique over time. MATERIALS AND METHODS: This was a descriptive, correlational study involving adult firefighters who were members of a specific firefighter group, comprising a population of 105 individuals with a voluntary sample of 44 participants. The study used a Bayesian statistical approach to provide probabilistic expressions. RESULTS: The participants had an average work experience of 17 years, an average age of 38.6 years, an average weight of 81.48 kilograms, an average height of 176 centimeters, and an average of 2.5 qualifications. The results indicated that the firefighters performed external chest compressions with excellent technique and a moderate level of perceived effort in a two-minute evaluation. The evaluation of the evolution of the technique over time showed that the participants were able to maintain high-quality compressions for an average of 6 minutes, with a maximum of 20 uninterrupted minutes. CONCLUSION: The study underscores the critical role of professional firefighters in performing and maintaining high-quality external chest compressions, which has the potential to reduce morbidity and mortality in cases of cardiorespiratory arrest.

6. J Am Heart Assoc. 2023 May 16;12(10):e027756. doi: 10.1161/JAHA.122.027756. Epub 2023 May 9.
Factors Impacting Treatment of Out-of-Hospital Cardiac Arrest: A Qualitative Study of Emergency Responders.
Missel AL(1), Dowker SR(1)(2)(3), Dzierwa D(2), Krein SL(4)(5)(6), Coulter-Thompson EI(1)(4), Williams M(1), Trumpower B(2), Swor R(7), Hunt N(3)(8), Friedman CP(1).
ABSTRACT
Background Of the more than 250 000 emergency medical services-treated out-of-hospital cardiac arrests that occur each year in the United States, only about 8% survive to hospital discharge with good neurologic function. Treatment for out-of-hospital cardiac arrest involves a system of care that includes complex interactions among multiple stakeholders. Understanding the factors inhibiting optimal care is fundamental to improving outcomes. Methods and Results We conducted group interviews with emergency responders including 911 telecommunicators, law enforcement officers, firefighters, and transporting emergency medical services personnel (ie, emergency medical technicians and paramedics) who responded to the same out-of-hospital cardiac arrest incident. We used the American Heart Association System of Care as the framework for our analysis to identify themes and their contributory factors from these interviews. We identified 5 themes under the structure domain, which included workload, equipment, prehospital communication structure, education and competency, and patient attitudes. In the process domain, 5 themes were identified focusing on preparedness, field response and access to patient, on-scene logistics, background

information acquisition, and clinical interventions. We identified 3 system themes including emergency responder culture; community support, education, and engagement; and stakeholder relationships. Three continuous quality improvement themes were identified, which included feedback provision, change management, and documentation. Conclusions We identified structure, process, system, and continuous quality improvement themes that may be leveraged to improve outcomes for out-of-hospital cardiac arrest. Interventions or programs amenable to rapid implementation include improving prearrival communication between agencies, appointing patient care and logistical leadership on-scene, interstakeholder team training, and providing more standardized feedback to all responder groups.

7. Pediatr Emerg Med Pract. 2023 Jun 1;20(6):1-28. Print 2023 Jun.
A review of the 2020 update of the Pediatric Advanced Life Support guidelines.
Hoffmann RM(1), Miller AF(2).
ABSTRACT
Pediatric cardiac arrest presents an infrequent but high-stakes event for emergency clinicians, who need to maintain expertise in this area. Evidence regarding pediatric resuscitations has been accumulating substantially over the past decade and highlights the unique considerations and challenges when resuscitating children. This issue reviews resuscitation principles of children in cardiac arrest while addressing the newest evidence-based and best-practice recommendations by the American Heart Association.

8. Resusc Plus. 2023 May 8;14:100393. doi: 10.1016/j.resplu.2023.100393. eCollection 2023 Jun.
An effort to reduce chest compression pauses during automated external defibrillator use among laypeople: A randomized partially blinded controlled trial.
Abelairas-Gómez C(1)(2)(3), Carballo-Fazanes A(2)(4)(3), Martínez-Isasi S(2)(4)(3), López-García S(5), Rodríguez-Núñez A(2)(4)(3)(6).
ABSTRACT
AIM: To implement small methodological changes in basic life support (BLS) training to reduce unnecessary pauses during automated external defibrillator (AED) use. METHODS: One hundred and two university students with no BLS knowledge were randomly allocated into three groups (control and 2 experimental groups). Both experimental groups received a two-hour BLS training. While the contents were identical in both groups, in one of them the reduction of no-flow time was focused on (focused no-flow group). The control group did not receive any training. Finally, all of them were evaluated in the same out-of-hospital cardiac arrest simulated scenario. The primary endpoint was the compression fraction. RESULTS: Results from 78 participants were analysed (control group: 19; traditional group: 30; focused no-flow group: 29). The focused no-flow group achieved higher percentages of compression fraction (median: 56.0, interquartile rank (IQR): 53.5-58.5) than the traditional group (44.0, IQR: 42.0-47.0) and control group (52.0, IQR: 43.0-58.0) in the complete scenario. Participants from the control group performed compression-only cardiopulmonary resuscitation (CPR), while the other groups performed compression-ventilation CPR. CPR fraction was calculated, showing the fraction of time in which the participants were performing resuscitation manoeuvres. In this case, the focused no-flow group reached higher percentages of CPR fraction (77.6, IQR: 74.4-82.4) than the traditional group (61.9, IQR: 59.3-68.1) and the control group (52.0, IQR: 43.0-58.0). CONCLUSIONS: Laypeople having automated external defibrillation training focused on acting in anticipation of the AED prompts contributed to a reduction in chest compression pauses during an OHCA simulated scenario.

9. Ann Emerg Med. 2023 May 17:S0196-0644(23)00269-X. doi: 10.1016/ j.annemergmed. 2023.04.001. Online ahead of print.

Temporal Trends in Incidence and Survival from Sudden Cardiac Arrest Manifesting with Shockable and Nonshockable Rhythms: A 16-Year Prospective Study in a Large US Community.

Holmstrom L(1), Chugh H(1), Uy-Evanado A(1), Jui J(2), Reinier K(1), Chugh SS(3).

ABSTRACT

STUDY OBJECTIVE: The proportion of nonshockable sudden cardiac arrests (pulseless electrical activity and asystole) continues to rise. Survival is lower than shockable (ventricular fibrillation [VF]) sudden cardiac arrests, but there is little community-based information on temporal trends in the incidence and survival from sudden cardiac arrests based on presenting rhythms. We investigated community-based temporal trends in sudden cardiac arrest incidence and survival by presenting rhythm. METHODS: We prospectively evaluated the incidence of each presenting sudden cardiac arrest rhythm and survival outcomes for out-of-hospital events in the Portland, Oregon metro area (population of approximately 1 million, 2002 to 2017). We limited inclusion to cases of likely cardiac cause with resuscitation attempted by emergency medical services. RESULTS: Out of 3,723 overall sudden cardiac arrest cases, 908 (24%) presented with pulseless electrical activity, 1,513 (41%) with VF, and 1,302 (35%) with asystole. The incidence of pulseless electrical activity-sudden cardiac arrest remained stable over 4-year periods (9.6/100,000 in 2002 to 2005, 7.4/100,000 in 2006 to 2009, 5.7/100,000 in 2010 to 2013, and 8.3/100,000 in 2014 to 2017; unadjusted beta [β] -0.56; 95% confidence interval [CI], -3.98 to 2.85). The incidence of VF-sudden cardiac arrests decreased over time (14.6/100,000 in 2002 to 2005, 13.4/100,000 in 2006 to 2009, 12.0/100,000 in 2010 to 2013, and 11.6/100,000 in 2014 to 2017; unadjusted β -1.05; 95% CI, -1.68 to -0.42) and asystole-sudden cardiac arrests (8.6/100,000 in 2002 to 2005, 9.0/100,000 in 2006 to 2009, 10.3/100,000 in 2010 to 2013, and 15.7/100,000 in 2014 to 2017; unadjusted β 2.25; 95% CI -1.24 to 5.73) did not change significantly over time. Survival increased over time for pulseless electrical activity-sudden cardiac arrests (5.7%, 4.3%, 9.6%, 13.6%; unadjusted β 2.8%; 95% CI 1.3 to 4.4) and VF-sudden cardiac arrests (27.5%, 29.8%, 37.9%, 36.6%; unadjusted β 3.5%; 95% CI 1.4 to 5.6), but not for asystole-sudden cardiac arrests (1.7%, 1.6%, 4.0%, 2.4%; unadjusted β 0.3%; 95% CI, -0.4 to 1.1). Enhancements in the emergency medical services system's pulseless electrical activity-sudden cardiac arrest management were temporally associated with the increasing pulseless electrical activity survival rates. CONCLUSIONS: Over a 16-year period, the incidence of VF/ventricular tachycardia decreased over time, but pulseless electrical activity incidence remained stable. Survival from both VF-sudden cardiac arrests and pulseless electrical activity-sudden cardiac arrests increased over time with a more than 2-fold increase for pulseless electrical activity-sudden cardiac arrests.

10. Rand Health Q. 2023 May 15;10(2):2. eCollection 2023 May.

Strategies for Enhancing Prehospital Outcomes for Cardiac Arrest (EPOC).

Abir M, Dowker SR, Nham W, Berri N, Fouche S, Nelson C, Forman J, Fetters MD, Mendel P, Guetterman T, Forbush B, Neumar R, Nallamothu B.

ABSTRACT

Out-of-hospital cardiac arrest (OHCA) is a common, life-threatening event that is a leading cause of death in the United States. However, it is unclear how to design strategies that can be successfully implemented in emergency medical services (EMS) agencies and broader emergency response systems (such as fire, police, dispatch, and bystanders to OHCA events) in different communities to help improve daily care processes and outcomes in OHCA. The National Heart, Lung, and Blood Institute-funded Enhancing Prehospital Outcomes for Cardiac Arrest (EPOC) study lays the foundation for future quality improvement efforts in OHCA by identifying, understanding, and

validating the best practices adopted within emergency response systems to address these life-threatening events and by addressing potential barriers to implementation of these practices. RAND researchers developed recommendations covering all levels of the prehospital OHCA incident response and the principles of change management necessary to implement those recommendations.

11. Resuscitation. 2023 May 15:109835. doi: 10.1016/j.resuscitation.2023.109835. Online ahead of print.

"Learn to Drive. Learn CPR.": A Lifesaving Initiative for the Next Generation of drivers.

Semeraro F(1), Picardi M(2), Monsieurs KG(3); European Resuscitation Council of the European Driving Schools Association.

NO ABSTRACT AVAILABLE

12. Resuscitation. 2023 May 15:109834. doi: 10.1016/j.resuscitation.2023.109834. Online ahead of print.

Emergency Medical Services Handoff of Patients in Cardiac Arrest in the Emergency Department: A Retrospective Video Review Study of Duration and Details of Handoff.

Howell DM(1), Margius D(1), Li T(2), Cohen AL(2), McCann-Pineo M(3), Haddad G(4), Becker L(5), Young EA(1), Rolston DM(2), Jafari D(2).

ABSTRACT

STUDY OBJECTIVES: We aimed to evaluate the duration and frequency of communication between EMS (Emergency Medical Services) and ED (Emergency Department) staff during handoff and the subsequent time to critical cardiac care (rhythm determination, defibrillation) using CA (cardiac arrest) video review. METHODS: A single-center retrospective study of video-recorded adult CAs between August 2020 and December 2022 was performed. Two investigators assessed the communication of 17 data points, time intervals, EMS initiation of handoff, and type of EMS agency. Median times from initiation of handoff to first ED rhythm determination and defibrillation were compared between the groups above versus below the median number of data points communicated. RESULTS: Overall, 95 handoffs were reviewed. The handoff was initiated in a median of 2 seconds (interquartile range (IQR) 0-10) after arrival. EMS initiated handoff in 65 (69.2%) patients. The median number of data points communicated was 9 and median duration was 66 seconds (IQR 50-100). Age, location of arrest, estimated down time, and medications administered were communicated >80% of the time, initial rhythm 79%, and bystander cardiopulmonary resuscitation and witnessed arrest <50%. The median times from initiation of handoff to first ED rhythm determination and defibrillation were 188 (IQR 106-256) and 392 (IQR 247-725) seconds, though not statistically different between handoffs with <9 vs. ≥9 data points communicated ($p>0.40$). CONCLUSION: There is no standardization for handoff reports from EMS to ED staff for CA patients. Using video review, we demonstrated the variable communication during handoff. Improvements to this process could reduce the time to critical interventions.

13. Prehosp Emerg Care. 2023 May 17:1-6. doi: 10.1080/10903127.2023.2214221. Online ahead of print.

Secondary Public Safety Answering Points Delay the Response to Out of Hospital Cardiac Arrest.

Moeller BJ(1), Jameson AM(2), Elkes J(3), Lozano M Jr(2).

ABSTRACT

Background:National guidelines recommend that high-performing systems process 9-1-1 calls within 60 seconds and deliver the first telecommunicator cardiopulmonary resuscitation compression

within 90 seconds. The inability of systems employing secondary public safety answering points (PSAPs) to capture the call arrival timestamp at the primary PSAP is a challenge in out-of-hospital cardiac arrest response time research.Objective: We sought to measure the interval from call receipt at primary PSAPs to call answer at secondary PSAPs in metropolitan areas.Methods:This was a retrospective observational study evaluating 9-1-1 call transfers between PSAPs serving large urban populations. Call transfer records were extracted from the 9-1-1 telephony systems at the primary and secondary PSAPs covering seven metropolitan EMS systems. For each transferred call, we obtained the call arrival timestamp at both the primary and secondary PSAPs. The primary outcome was the interval between these two times. Results were compared to a national standard of 90% of calls forwarded within 30 seconds of receipt.Results:Data collected at seven metropolitan EMS agencies from January 1, 2021, through June 30, 2021, yielded 299,679 records for evaluation. The median interval required to transfer a 9-1-1 caller from primary to secondary PSAPs was 41 seconds (IQR 31, 59), and 86 seconds at the 90th percentile. The 90th percentile performance level at individual agencies ranged from 63 seconds to 117 seconds.Conclusions:The primary to secondary PSAP transfer interval lengths observed in this study preclude these EMS agencies from meeting out-of-hospital cardiac arrest performance recommendations at the 90% percentile performance level.

14. Catheter Cardiovasc Interv. 2023 May 16. doi: 10.1002/ccd.30677. Online ahead of print.
A machine learning algorithm to predict a culprit lesion after out of hospital cardiac arrest.
Pareek N(1)(2), Frohmaier C(3)(4), Smith M(4), Kordis P(5), Cannata A(1)(2), Nevett J(6), Fothergill R(6), Nichol RC(3), Sullivan M(4), Sunderland N(5), Johnson TW(5), Noc M(7), Byrne J(1)(2), MacCarthy P(1)(2), Shah AM(2).
ABSTRACT
BACKGROUND: We aimed to develop a machine learning algorithm to predict the presence of a culprit lesion in patients with out-of-hospital cardiac arrest (OHCA). METHODS: We used the King's Out-of-Hospital Cardiac Arrest Registry, a retrospective cohort of 398 patients admitted to King's College Hospital between May 2012 and December 2017. The primary outcome was the presence of a culprit coronary artery lesion, for which a gradient boosting model was optimized to predict. The algorithm was then validated in two independent European cohorts comprising 568 patients. RESULTS: A culprit lesion was observed in 209/309 (67.4%) patients receiving early coronary angiography in the development, and 199/293 (67.9%) in the Ljubljana and 102/132 (61.1%) in the Bristol validation cohorts, respectively. The algorithm, which is presented as a web application, incorporates nine variables including age, a localizing feature on electrocardiogram (ECG) (≥2 mm of ST change in contiguous leads), regional wall motion abnormality, history of vascular disease and initial shockable rhythm. This model had an area under the curve (AUC) of 0.89 in the development and 0.83/0.81 in the validation cohorts with good calibration and outperforms the current gold standard-ECG alone (AUC: 0.69/0.67/0/67). CONCLUSIONS: A novel simple machine learning-derived algorithm can be applied to patients with OHCA, to predict a culprit coronary artery disease lesion with high accuracy.

15. Saudi Med J. 2023 May;44(5):463-470. doi: 10.15537/smj.2023.44.5.20220941.
Fit-cardiopulmonary resuscitation approach in public mass cardiopulmonary resuscitation teaching: A randomized control trial.
Sanip A(1), Isa MH(1), Abd Samat AH(1), Jaafar MJ(1), Abdul Manaf MR(1), Silvalila M(1), Saiboon IM(1).
ABSTRACT

OBJECTIVES: To improve public awareness and the rate of bystander cardiopulmonary resuscitation (CPR), a novel and exciting approach called fit-CPR that incorporates mass CPR with high-intensity physical activity into the beat of locally favoured music was proposed. This study was conducted to measure the effectiveness of fit-CPR compared to the standard classroom method (CCM). METHODS: Between 30th August to 29th November 2018, 129 participants from Syiah Kuala University, Banda Aceh, Indonesia, were randomized to learn CPR, either through fit-CPR or CCM protocol. All participants underwent pre, post, and 6-month retention tests. Each test had a 10-item questionnaire with CPR performance on a manikin that was assessed using a validated checklist. RESULTS: Sixty-one (47.3%) participants completed the fit-CPR while 68 (52.7%) completed the CCM. There was a significant improvement in knowledge, performance, and quality of CPR from pre, post, and 6-month retention tests ($p<0.01$) in both groups. On high-quality CPR, the fit-CPR and CCM groups obtained an increased score of 285.0% and 151%, respectively, $p=0.014$ between pre and immediate post-test. Knowledge scores between fit-CPR and CCM groups showed an increase of 79.5% and 111.2%, respectively, $p=0.002$. Fit-CPR was completed between 52.5-57.5 minutes, while CCM took 75 minutes. CONCLUSION: The fit-CPR demonstrated a comparable outcome to standard CPR when teaching to the mass public with less time spent.

16. J Am Coll Emerg Physicians Open. 2023 May 9;4(3):e12957. doi: 10.1002/emp2.12957. eCollection 2023 Jun.

One-year survival after out-of- hospital cardiac arrest: Sex-based survival analysis in a Canadian population.

Awad E(1)(2), Fordyce CB(2)(3), Grunau B(1)(2), Christenson J(1)(2), Helmer J(2)(4), Humphries K(2)(3)(5).

ABSTRACT

OBJECTIVE: We investigated sex differences in 1-year survival in a cohort of patients who survived out-of-hospital cardiac arrest (OHCA) to hospital discharge. We hypothesized that female sex is associated with higher 1-year posthospital discharge survival. METHODS: A retrospective analysis of linked data (2011-2017) from clinical databases in British Columbia (BC) was conducted. We used Kaplan-Meier curves, stratified by sex, to display survival up to 1-year, and the log-rank test to test for significant sex differences. This was followed by multivariable Cox proportional hazards analysis to investigate the association between sex and 1-year mortality. The multivariable analysis adjusted for variables known to be associated with survival, including variables related to OHCA characteristics, comorbidities, medical diagnoses, and in-hospital interventions. RESULTS: We included 1278 hospital-discharge survivors; 284 (22.2%) were female. Females had a lower proportion of OHCA occurring in public locations (25.7% vs. 44.0%, $P < 0.001$), a lower proportion with a shockable rhythm (57.7% vs. 77.4%, $P < 0.001$), and fewer hospital-based acute coronary diagnoses and interventions. One-year survival for females and males was 90.5% and 92.4%, respectively (log-rank $P = 0.31$). Unadjusted (hazard ratio [HR] males vs. females 0.80, 95% confidence interval [CI] 0.51-1.24, $P = 0.31$) and adjusted (HR males vs. females 1.14, 95% CI 0.72-1.81, $P = 0.57$) models did not detect differences in 1-year survival by sex. CONCLUSION: Females have relatively unfavorable prehospital characteristics in OHCA and fewer hospital-based acute coronary diagnoses and interventions. However, among survivors to hospital discharge, we found no significant difference between males and females in 1-year survival, even after adjustment.

17. Resuscitation. 2023 May 15:109836. doi: 10.1016/j.resuscitation.2023.109836. Online ahead of print.

Resuscitation Preferences of Older Acutely Admitted Medical and Mentally Competent Patients with One and Six Months Follow-up.

Hanson S(1), Lassen A(2), Nielsen D(3), Ryg J(4), Forero R(5), Brabrand M(6).

ABSTRACT

AIM: Determining patients' cardiopulmonary resuscitation (CPR) preferences in the emergency department (ED) is common practice but the stability of these preferences and their recollection by patients has been questioned. Therefore, this study assessed the stability and recall of CPR preferences of older patients at and following ED discharge. METHODS: This survey-based cohort study was conducted between February and September 2020 at three EDs in Denmark. It consecutively asked mentally competent patients aged 65 years or older who were admitted to hospital through the ED and then one and six months later "In your current state of health, do you wish that physicians should try to intervene if your heart stops beating?" Possible responses were confined to "definitely yes", "definitely no", "uncertain", and "prefer not to answer". RESULTS: In total, 3688 patients admitted to hospital via the ED patients were screened, 1766 were eligible and 491 (27.8%) were included: median age was 76 (IQR 71-82) years, and 257 (52.3%) were men. One third of patients who expressed definite yes or no preferences in ED had changed their preference at one month follow-up. Only 90 (27.4%) and 94 (35.7%) patients recalled their preferences at one and six months follow-up, respectively. CONCLUSION: and Relevance In this study, one-in-three older ED patients who initially expressed definite resuscitation preferences had changed their minds at one month follow-up. Preferences were more stable at six months but only a minority were able to recall their preferences.

18. J Cardiovasc Med (Hagerstown). 2023 May 1;24(Suppl 2):e128-e133. doi: 10.2459/JCM.0000000000001421.

Systematic basic and advanced resuscitation training in medical students and fellows: a proposal from the Working Group on Cardiovascular Urgences and Emergencies of the Italian Society of Cardiology.

Saba PS(1), Canonico ME(2), Gambaro A(3), Gazale G(4), Piga S(5), Santomauro M(2), Roscio G(6); Working Group on Cardiovascular Urgences, Emergencies of the Italian Society of Cardiology.

ABSTRACT

Sudden cardiac arrest is a leading cause of death in Europe. High-quality cardiopulmonary resuscitation (CPR) and guidelines compliance of rescuers have been associated with better outcomes after cardiac arrest. However, wide variability in attempting bystander CPR manoeuvres has been reported. Educational programmes for teaching CPR to medical students and fellows are highly advisable in this context. However, there is no homogeneity regarding the CPR education offered by academic institutions. We surveyed 208 Italian medical students and 162 fellows in cardiology regarding the educational offer and needs in CPR. Among the 11 medical schools surveyed, 8 (73%) offer basic (BLS) courses but only 3 (38%) with formal certification of 'BLS provider', while none offers advanced (ACLS/ALS) courses. Among the 30 specialization schools in cardiology surveyed, 10 (33%) offer a BLS course (6 with formal certification of 'BLS provider'), and 8 (27%) offer an ACLS/ALS course (5 with formal certification). Only a minority of students and fellows perceive themselves as highly proficient either in BLS or ACLS/ALS, although most of the fellows were involved at least once in rescuing a cardiac arrest. The present position paper analyses and suggests the strategies that should be adopted by Italian medical and specialization schools to spread the CPR culture and increase the long-standing retention of CPR-related technical and nontechnical skills.

POST-CARDIAC ARREST TREATMENTS

1. Resuscitation. 2023 May 17:109846. doi: 10.1016/j.resuscitation.2023.109846. Online ahead of print.

Protective positive psychology factors and emotional distress after cardiac arrest.

Presciutti AM(1), Flickinger KL(2), Coppler PJ(2), Ratay C(2), Doshi AA(2), Perman SM(3), Vranceanu AM(4), Elmer J(5).

ABSTRACT

BACKGROUND: There is a critical need to identify factors that can prevent emotional distress post-cardiac arrest (CA). CA survivors have previously described benefitting from utilizing positive psychology constructs (mindfulness, existential well-being, resilient coping, social support) to cope with distress. Here, we explored associations between positive psychology factors and emotional distress post-CA. METHODS: We recruited CA survivors treated from 4/2021-9/2022 at a single academic medical center. We assessed positive psychology factors (mindfulness [Cognitive and Affective Mindfulness Scale-Revised], existential well-being [Meaning in Life Questionnaire Presence of Meaning subscale], resilient coping [Brief Resilient Coping Scale], perceived social support [ENRICHD Social Support Inventory]) and emotional distress (posttraumatic stress [Posttraumatic Stress Checklist-5], anxiety and depression symptoms [PROMIS Emotional Distress - Anxiety and Depression Short Forms 4a]) just before discharge from the index hospitalization. We selected covariates for inclusion in our multivariable models based on an association with any emotional distress factor ($p < 0.10$). For our final, multivariable regression models, we individually tested the independent association of each positive psychology factor and emotional distress factor. RESULTS: We included 110 survivors (mean age 59 years, 64% male, 88% non-Hispanic White, 48% low income); 36.4% of survivors scored above the cut-off for at least one measure of emotional distress. In separate adjusted models, each positive psychology factor was independently associated with emotional distress (β: -0.20 to -0.42, all $p < 0.05$). CONCLUSIONS: Higher levels of mindfulness, existential well-being, resilient coping, and perceived social support were each associated with less emotional distress. Future intervention development studies should consider these factors as potential treatment targets.

2. Resuscitation. 2023 May 15:109838. doi: 10.1016/j.resuscitation.2023.109838. Online ahead of print.

Lower versus higher oxygenation targets in hypoxaemic ICU patients after cardiac arrest.

Crescioli E(1), Lass Klitgaard Klitgaard T(2), Perner A(3), Lilleholt Schjørring O(4), Steen Rasmussen B(4).

ABSTRACT

AIM: To investigate the effects of lower versus higher oxygenation targets in adult intensive care unit (ICU) patients with hypoxaemic respiratory failure after cardiac arrest. METHODS: Subgroup analysis of the international Handling Oxygenation Targets in the ICU (HOT-ICU) trial which randomised 2928 adults with acute hypoxaemia to targets of arterial oxygenation of 8 kPa or 12 kPa in the ICU for up to 90 days. Here, we report all outcomes up to one year in the subgroup of patients enrolled after cardiac arrest. RESULTS: The HOT-ICU trial included 335 patients after cardiac arrest: 149 in the lower-oxygenation group and 186 in the higher-oxygenation group. At 90 days, 96/147 patients (65.3%) in the lower-oxygenation group and 111/185 patients (60.0%) in the higher-oxygenation group had died (adjusted relative risk (RR) 1.09, 95% confidence interval (CI) 0.92-1.28, p=0.32); similar results were found at one year (adjusted RR 1.05, 95% CI 0.90-1.21, p=0.53). Serious adverse events (SAEs) in the ICU occurred in 23% of patients in the lower-oxygenation group and 38% in the higher-oxygenation group (adjusted RR 0.61, 95% CI 0.43-0.86, p=0.005); the difference was mainly due to more new episodes of shock in the higher-oxygenation group. No statistically significant differences were observed in other secondary outcomes. CONCLUSION: A lower oxygenation target in adult ICU patients with hypoxaemic respiratory failure after cardiac arrest did not result in lower

mortality, but fewer SAEs occurred in this group compared to the higher-oxygenation group. All analyses are exploratory only, large-scale trials are needed for confirmation.

3. Cardiol J. 2023 May 15. doi: 10.5603/CJ.a2023.0032. Online ahead of print.
Out-of-hospital cardiac arrest: Do we have to perform coronary angiography?
Wańha W(1)(2), Kołodziejczak M(3)(4), Kowalewski M(5)(6), Januszek R(7), Kuźma Ł(8), Jaguszewski M(9)(4), Tomaniak M(10)(4), Darocha S(11)(4), Kupczyńska K(12)(4), Dobrowolski P(13)(4), Tymińska A(10)(4), Ciepłucha A(14)(4), Sokolska J(15)(4), Kapłon-Cieślicka A(10)(4), Kułach A(16)(4), Wybraniec M(16)(4), Roleder T(17)(18), Tajstra M(19), Nadolny K(20)(21), Darocha T(22), Sierakowska K(3), Pawłowski T(23), Gierlotka M(24), Lesiak M(14), Wita K(25), Gil R(26)(4), Trzeciak P(19).
ABSTRACT
Out-of-hospital cardiac arrest (OHCA) remains a leading cause of global mortality, while survivors are burdened with long-term neurological and cardiovascular complications. OHCA management at the hospital level remains challenging, due to heterogeneity of OHCA presentation, the critical status of OHCA patients reaching the return of spontaneous circulation (ROSC), and the demands of post ROSC treatment. The validity and optimal timing for coronary angiography is one important, yet not fully defined, component of OHCA management. Guidelines state clear recommendations for coronary angiography in OHCA patients with shockable rhythms, cardiogenic shock, or in patients with ST-segment elevation observed in electrocardiography after ROSC. However, there is no established consensus on the angiographic management in other clinical settings. While coronary angiography may accelerate the diagnostic and therapeutic process (provided OHCA was a consequence of coronary artery disease), it might come at the cost of impaired post-resuscitation care quality due to postponing of intensive care management. The aim of the current statement paper is to discuss clinical strategies for the management of OHCA including the stratification to invasive procedures and the rationale behind the risk-benefit ratio of coronary angiography, especially with patients in critical condition.

TARGETED TEMPERATURE MANAGEMENT

No articles identified.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. J Am Heart Assoc. 2023 May 16;12(10):e027923. doi: 10.1161/JAHA.122.027923. Epub 2023 May 15.
Association Between Postresuscitation 12-Lead ECG Features and Early Mortality After Out-of-Hospital Cardiac Arrest: A Post Hoc Subanalysis of the PEACE Study.
Gentile FR(1)(2), Baldi E(1)(2), Klersy C(3), Schnaubelt S(4), Caputo ML(5), Clodi C(4), Bruno J(5), Compagnoni S(1)(2), Fasolino A(1)(2), Benvenuti C(6), Domanovits H(3), Burkart R(6), Primi R(7), Ruzicka G(4), Holzer M(4), Auricchio A(5), Savastano S(7).
ABSTRACT
Background Once the return of spontaneous circulation after out-of-hospital cardiac arrest is achieved, a 12-lead ECG is strongly recommended to identify candidates for urgent coronary angiography. ECG has no apparent role in mortality risk stratification. We aimed to assess whether ECG features could be associated with 30-day survival in patients with out-of-hospital cardiac arrest. Methods and Results All the post-return of spontaneous circulation ECGs from January 2015 to December 2018 in 3 European centers (Pavia, Lugano, and Vienna) were collected. Prehospital data were collected according to the Utstein style. A total of 370 ECGs were collected: 287 men (77.6%) with a median age of 62 years (interquartile range, 53-70 years). After correction for the return of

spontaneous circulation-to-ECG time, age >62 years (hazard ratio [HR], 1.78 [95% CI, 1.21-2.61]; P=0.003), female sex (HR, 1.5 [95% CI, 1.05-2.13]; P=0.025), QRS wider than 120 ms (HR, 1.64 [95% CI, 1.43-1.87]; P<0.001), the presence of a Brugada pattern (HR, 1.49 [95% CI, 1.39-1.59]; P<0.001), and the presence of ST-segment elevation in >1 segment (HR, 1.75 [95% CI, 1.59-1.93]; P<0.001) were independently associated with 30-day mortality. A score ranging from 0 to 26 was created, and by dividing the population into 3 tertiles, 3 classes of risk were found with significantly different survival rate at 30 days (score 0-4, 73%; score 5-7, 66%; score 8-26, 45%). Conclusions The post-return of spontaneous circulation ECG can identify patients who are at high risk of mortality after out-of-hospital cardiac arrest earlier than other forms of prognostication. This provides important risk stratification possibilities in postcardiac arrest care that could help to direct treatments and improve outcomes in patients with out-of-hospital cardiac arrest.

2. Resuscitation. 2023 May 12:109830. doi: 10.1016/j.resuscitation.2023.109830. Online ahead of print.

Cognition, emotional state, and quality of life of survivors after cardiac arrest with rhythmic and periodic EEG patterns.

van Gils PCW(1), Ruijter BJ(2), Bloo RJK(3), van Putten MJAM(4), Foudraine NA(5), van Hout MSE(6), Tromp SC(7), van Mook WNKA(8), Rouhl RPW(9), van Heugten CM(10), Hofmeijer J(11); TELSTAR investigators.

ABSTRACT

AIM: Rhythmic and periodic patterns (RPPs) on the electroencephalogram (EEG) in comatose patients after cardiac arrest have been associated with high case fatality rates. A good neurological outcome according to the Cerebral Performance Categories (CPC) has been reported in up to 10% of cases. Data on cognitive, emotional, and quality of life outcomes are lacking. We aimed to provide insight into these outcomes at one-year follow-up. METHODS: We assessed outcome of surviving comatose patients after cardiac arrest with RPPs included in the 'treatment of electroencep-halographic status epilepticus after cardiopulmonary resuscitation' (TELSTAR) trial at one-year follow-up, including the CPC for functional neurological outcome, a cognitive assessment, the hospital anxiety and depression scale (HADS) for emotional outcomes, and the 36-item short-form health survey (SF-36) for quality of life. Cognitive impairment was defined as a score of more than 1.5 SD below the mean on ≥ 2 (sub)tests within a cognitive domain. RESULTS: Fourteen patients were included (median age 58 years, 21% female), of whom 13 had a cognitive impairment. Eleven of 14 were impaired in memory, 9/14 in executive functioning, and 7/14 in attention. The median scores on the HADS and SF-36 were all worse than expected. Based on the CPC alone, 8/14 had a good outcome (CPC 1-2). CONCLUSION: Nearly all cardiac arrest survivors with RPPs during the comatose state have cognitive impairments at one-year follow-up. The incidence of anxiety and depression symptoms seem relatively high and quality of life relatively poor, despite 'good' outcomes according to the CPC.

PEDIATRICS AND CHILDREN

1. Adv Simul (Lond). 2023 May 19;8(1):15. doi: 10.1186/s41077-023-00253-4.

Measuring cognitively demanding activities in pediatric out-of-hospital cardiac arrest.

Bahr N(1), Ivankovic J(2), Meckler G(3)(4), Hansen M(5), Eriksson C(6), Guise JM(7).

ABSTRACT

BACKGROUND: This methodological intersection article demonstrates a method to measure cognitive load in clinical simulations. Researchers have hypothesized that high levels of cognitive load reduce performance and increase errors. This phenomenon has been studied primarily by

experimental designs that measure responses to predetermined stimuli and self-reports that reduce the experience to a summative value. Our goal was to develop a method to identify clinical activities with high cognitive burden using physiologic measures. METHODS: Teams of emergency medical responders were recruited from local fire departments to participate in a scenario with a shockable pediatric out-of-hospital cardiac arrest (POHCA) patient. The scenario was standardized with the patient being resuscitated after receiving high-quality CPR and 3 defibrillations. Each team had a person in charge (PIC) who wore a functional near-infrared spectroscopy (fNIRS) device that recorded changes in oxygenated and deoxygenated hemoglobin concentration in their prefrontal cortex (PFC), which was interpreted as cognitive activity. We developed a data processing pipeline to remove nonneural noise (e.g., motion artifacts, heart rate, respiration, and blood pressure) and detect statistically significant changes in cognitive activity. Two researchers independently watched videos and coded clinical tasks corresponding to detected events. Disagreements were resolved through consensus, and results were validated by clinicians. RESULTS: We conducted 18 simulations with 122 participants. Participants arrived in teams of 4 to 7 members, including one PIC. We recorded the PIC's fNIRS signals and identified 173 events associated with increased cognitive activity. [Defibrillation] (N = 34); [medication] dosing (N = 33); and [rhythm checks] (N = 28) coincided most frequently with detected elevations in cognitive activity. [Defibrillations] had affinity with the right PFC, while [medication] dosing and [rhythm checks] had affinity with the left PFC. CONCLUSIONS: FNIRS is a promising tool for physiologically measuring cognitive load. We describe a novel approach to scan the signal for statistically significant events with no a priori assumptions of when they occur. The events corresponded to key resuscitation tasks and appeared to be specific to the type of task based on activated regions in the PFC. Identifying and understanding the clinical tasks that require high cognitive load can suggest targets for interventions to decrease cognitive load and errors in care.

2. Resuscitation. 2023 May 15:109839. doi: 10.1016/j.resuscitation.2023.109839. Online ahead of print.

Association between the relationship of bystander and neurologic recovery in pediatric out-of-hospital cardiac arrest.

Whan Jung S(1), Hong Kim K(2), Ho Park J(3), Han Kim T(4), Jeong J(5), Sun Ro Y(6), Jeong Hong K(7), Jun Song K(8), Do Shin S(9).

ABSTRACT

AIM: This study aimed to evaluate whether the relationship between bystanders and victims is associated with neurological outcomes in paediatric out-of-hospital cardiac arrest (OHCA). METHODS: This cross-sectional, retrospective, observational study included patients with non-traumatic paediatric OHCA undergoing emergency medical service treatment between 2014 and 2021. The relationship between bystanders and patients was categorized into first responder, family, and layperson groups. The primary outcome was good neurological recovery. Further sensitivity analyses were conducted subcategorizing the cohort into four groups: first responder, family, friends or colleagues, and layperson, or two groups: family and non-family. RESULTS: We analysed 1,451 patients. OHCAs in the family group showed lower rate of good neurological outcomes regardless of witness status: 29.4%, 12.3%, and 38.6% in the first responder, family, and layperson groups in the witnessed and 6.7%, 2.0%, and 7.3% in the unwitnessed cohort. Multivariable logistic regression yielded no significant differences between the three groups: the adjusted odds ratios (AOR) and 95% confidence interval (CI) were 0.57 (0.28-1.15) in the family and 1.18 (0.61-2.29) in the layperson compared to the first responder group. The sensitivity analysis yielded a higher probability of good neurologic recovery in the non-family compared to the family member bystander group in witnessed

cohort (AOR, 1.96; 95% CI, 1.17-3.30). CONCLUSION: Paediatric OHCAs had no significant difference between good neurological recovery and the relationship of bystander.

3. JAMA Netw Open. 2023 May 1;6(5):e2313931. doi: 10.1001/jamanetworkopen.2023.13931.
Understanding Challenges to High-quality Pediatric Out-of-Hospital Cardiac Arrest Resuscitation Performance.
O'Halloran A(1), Nishisaki A(1).
NO ABSTRACT AVAILABLE

4. Circ Cardiovasc Qual Outcomes. 2023 May;16(5):e009786. doi: 10.1161/ CIRCOUTCOMES. 122.009786.Epub 2023 May 16.
Disability-Adjusted Life Years Due to Pediatric Out-of-Hospital Cardiac Arrest in the United States: A CARES Surveillance Group Study.
Coute RA(1), Nathanson BH(2), DeMasi S(3), Mader TJ(4), Kurz MC(1)(5); CARES Surveillance Group*.
ABSTRACT
BACKGROUND: Disability-adjusted life years (DALY) are a common public health metric used to estimate disease burden. The DALY due to pediatric out-of-hospital cardiac arrest (OHCA) in the United States is unknown. We aimed to estimate pediatric OHCA DALY and to compare it with the other leading causes of pediatric death and disability in the United States. METHODS: We conducted a retrospective observational analysis of the national Cardiac Arrest Registry to Enhance Survival database. DALY were calculated as the sum of years of life lost and years lived with disability. Years of life lost were calculated using all pediatric (age <18 years) nontraumatic OHCA from the Cardiac Arrest Registry to Enhance Survival from 2016 to 2020. Disability weights based on cerebral performance category scores, an outcome measure of neurologic function, were used to estimate years lived with disability . Data were reported as total, mean, and rate per 100 000 individuals, and were compared with the leading causes of pediatric DALY in the United States published by the Global Burden of Disease study for 2019. RESULTS: Totally 11 177 OHCA met the study inclusion criteria. A modest increase in total OHCA DALY in the United States was observed from 407 500 (years of life lost = 407 435 and years lived with disability =65) in 2016 to 415 113 (years of life lost = 415 055 and years lived with disability =58) in 2020. The DALY rate increased from 553.3 per 100 000 individuals in 2016 to 568.3 per 100 000 individuals in 2020. For 2019, OHCA was the 10th leading cause of pediatric DALY lost behind neonatal disorders, injuries, mental disorders, premature birth, musculoskeletal disorders, congenital birth defects, skin diseases, chronic respiratory diseases, and asthma. CONCLUSIONS: Nontraumatic OHCA is one of the top 10 leading causes of annual pediatric DALY lost in the United States.

EXTRACORPOREAL LIFE SUPPORT

1. EClinicalMedicine. 2023 May 5;59:101988. doi: 10.1016/j.eclinm.2023.101988. eCollection 2023 May.
Intraarrest transport, extracorporeal cardiopulmonary resuscitation, and early invasive management in refractory out-of-hospital cardiac arrest: an individual patient data pooled analysis of two randomised trials.
Belohlavek J(1), Yannopoulos D(2), Smalcova J(1), Rob D(1), Bartos J(2), Huptych M(3), Kavalkova P(1), Kalra R(2), Grunau B(4), Taccone FS(5), Aufderheide TP(6).
ABSTRACT
BACKGROUND: Refractory out-of-hospital cardiac arrest (OHCA) treated with standard advanced cardiac life support (ACLS) has poor outcomes. Transport to hospital followed by in-hospital

extracorporeal cardiopulmonary resuscitation (ECPR) initiation may improve outcomes. We performed a pooled individual patient data analysis of two randomised controlled trials evaluating ECPR based approach in OHCA. METHODS: The individual patient data from two published randomised controlled trials (RCTs) were pooled: ARREST (enrolled Aug 2019-June 2020; NCT03880565) and PRAGUE-OHCA (enrolled March 1, 2013-Oct 25, 2020; NCT01511666). Both trials enrolled patients with refractory OHCA and compared: intra-arrest transport with in-hospital ECPR initiation (invasive approach) versus continued standard ACLS. The primary outcome was 180-day survival with favourable neurological outcome (defined as Cerebral Performance Category 1-2). Secondary outcomes included: cumulative survival at 180 days, 30-day favourable neurological survival, and 30-day cardiac recovery. Risk of bias in each trial was assessed by two independent reviewers using the Cochrane risk-of-bias tool. Heterogeneity was assessed via Forest plots. FINDINGS: The two RCTs included 286 patients. Of those randomised to the invasive (n = 147) and standard (n = 139) groups, respectively: the median age was 57 (IQR 47-65) and 58 years (IQR 48-66), and the median duration of resuscitation was 58 (IQR 43-69) and 49 (IQR 33-71) minutes (p = 0.17). In a modified intention to treat analysis, 45 (32.4%) in the invasive and 29 (19.7%) patients in the standard arm survived to 180 days with a favourable neurological outcome [absolute difference (AD), 95% CI: 12.7%, 2.6-22.7%, p = 0.015]. Forty-seven (33.8%) and 33 (22.4%) patients survived to 180 days [HR 0.59 (0.43-0.81); log rank test p = 0.0009]. At 30 days, 44 (31.7%) and 24 (16.3%) patients had favourable neurological outcome (AD 15.4%, 5.6-25.1%, p = 0.003), 60 (43.2%), and 46 (31.3%) patients had cardiac recovery (AD: 11.9%, 0.7-23%, p = 0.05), in the invasive and standard arms, respectively. The effect was larger in patients presenting with shockable rhythms (AD 18.8%, 7.6-29.4; p = 0.01; HR 2.26 [1.23-4.15]; p = 0.009) and prolonged CPR (>45 min; HR 3.99 (1.54-10.35); p = 0.005). INTERPRETATION: In patients with refractory OHCA, the invasive approach significantly improved 30- and 180-day neurologically favourable survival.

2. Resuscitation. 2023 May 15:109842. doi: 10.1016/j.resuscitation.2023.109842. Online ahead of print.

The Impact Of BMI On Arrest Characteristics and Survival of Patients with Out-Of-Hospital Cardiac Arrest Treated With Extracorporeal Cardiopulmonary Resuscitation.

Kosmopoulos M(1), Kalra R(1), Alexy T(1), Gaisendrees C(2), Jaeger D(3), Chahine J(1), Voicu S(4), Tsangaris A(1), Gutierrez AB(1), Elliott A(1), Bartos JA(1), Yannopoulos D(5).

ABSTRACT

AIM: To assess the impact of body mass index (BMI) on survival to hospital discharge of patients presenting with refractory ventricular fibrillation treated with extracorporeal cardiopulmonary resuscitation. We hypothesize that due to limitations in pre-hospital care delivery, people with high BMI have worse survival after prolonged resuscitation and ECPR. METHODS: This study is a retrospective single-centre study that included patients suffering refractory VT/VF OHCA from December 2015 to October 2021 and had a BMI calculated at hospital admission. We compared the baseline characteristics and survival between patients with obesity (>30 kg/m2) and those without (≤30kg/m2). RESULTS: Two-hundred eighty-three patients were included in this study, and two-hundred twenty-four required mechanical support with veno-arterial extracorporeal cardio-pulmonary membrane oxygenation (VA ECMO). Patients with BMI >30 (n = 133) had significantly prolonged CPR duration compared to their peers with BMI ≤30kg/m2 (n = 150) and were significantly more likely to require support with VA ECMO (85.7% vs 73.3%, p = 0.015). Survival to hospital discharge was significantly higher in patients with BMI≤30 kg/m2 (48% vs. 29.3%, p <0.001). BMI was an independent predictor of mortality in a multivariable logistic regression analysis. The four-year mortality rate was low and not significantly different between the two groups (p=0.32). CONCLUSION: ECPR yields clinically meaningful long-term survival in patients with BMI>30kg/m2. However, the resuscitation time is significantly prolonged, and the overall survival significantly lower compared to patients with BMI≤30 kg/m2. ECPR should, therefore, not be withheld for this

population, but faster transport to an ECMO capable centre is mandated to improve survival to hospital discharge.

3. Anasthesiol Intensivmed Notfallmed Schmerzther. 2023 May;58(5):292-303. doi: 10.1055/a-1859-0131. Epub 2023 May 16.
[Extracorporeal Life Support in Critical Care Medicine]. [Article in German]
Ajouri J, Lepper PM, Spangenberg T, Schneider NRE, Muellenbach RM.
ABSTRACT
Veno-arterial extracorporeal life support (ECLS) may be indicated in patients with refractory heart failure. The list of conditions in which ECLS is successfully used is growing and includes cardiogenic shock following myocardial infarction, refractory cardiac arrest, septic shock with low cardiac output and severe intoxication. Femoral ECLS is the most common and often preferred ECLS-configuration in the emergency setting. Although femoral access is usually quick and easy to establish, it is also associated with specific adverse haemodynamic effects due to the direction of blood flow and access-site complications are inherent. Femoral ECLS provides adequate oxygen delivery and compensates for impaired cardiac output. However, retrograde blood flow into the aorta increases left ventricular afterload and may worsen left ventricular stroke work. Therefore, femoral ECLS is not equivalent to left ventricular unloading. Daily haemodynamic assessments are crucial and should include echocardiography and laboratory tests determining tissue oxygenation. Common complications include the harlequin-phenomenon, lower limb ischaemia or cerebral events and cannula site or intracranial bleeding. Despite a high incidence of complications and high mortality, ECLS is associated with survival benefits and better neurological outcomes in selected patient groups.

4. Resuscitation. 2023 May 17:109837. doi: 10.1016/j.resuscitation.2023.109837. Online ahead of print.
Prevalence and Geographic Features of Patients Eligible for Extracorporeal Cardiopulmonary Resuscitation.
McCloskey C(1), Zeller J(2), Berk A(3), Patil N(4), Ajayakumar J(5), Curtis A(6), Curtis J(7).
ABSTRACT
OBJECTIVE: This study sought to identify Out of Hospital Cardiac Arrests (OHCA) eligible for Extracorporeal Cardiopulmonary Resuscitation (ECPR), use Geographic Information Systems (GIS) to investigate geographic patterns, and investigate if correlation between ECPR candidacy and Social Determinants of Health (SDoH) exist. METHODS: This study is of emergency medical service (EMS) runs for OHCA to an urban medical center from January 1, 2016 to December 31, 2020. All runs were filtered to inclusion criteria for ECPR: age 18-65, initial shockable rhythm, and no return of spontaneous circulation within initial defibrillations. Address level data were mapped in a GIS. Cluster detection assessed for granular areas of high concentration. The Center for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) was overlaid. The SVI ranges from 0-1 with higher values indicating increasing social vulnerability. RESULTS: There were 670 EMS transports for OHCA during the study period. 12.7% (85/670) met inclusion criteria for ECPR. 90% (77/85) had appropriate addresses for geocoding. Three geographic clusters of events were detected. Two were residential areas and one was concentrated over a public use area of downtown Cleveland. The SVI for these locations was 0.79, indicative of high social vulnerability. Nearly half (32/77, 41.5%) occurred in neighborhoods with the highest level of social vulnerability (SVI ≥0.9). CONCLUSION: A significant proportion of OHCAs were eligible for ECPR based on prehospital criteria. Utilizing GIS to map and analyze ECPR patients provided insights into the locations of these events and the SDoH that may be driving risk in these places.

5. JAMA. 2023 May 16;329(19):1693-1694. doi: 10.1001/jama.2023.5585.
Extracorporeal Cardiopulmonary Resuscitation for Cardiac Arrest.

Granfeldt A(1)(2), Holmberg MJ(1), Andersen LW(1)(2)(3).

ABSTRACT

Plain Language Summary: This JAMA Insights Clinical Update discusses the newer treatment option of extracorporeal cardiopulmonary resuscitation, particularly for patients with cardiac arrest who are not responsive to initial treatment.

EXPERIMENTAL RESEARCH

1. Crit Care Explor. 2023 May 10;5(5):e0902. doi: 10.1097/CCE.0000000000000902. eCollection 2023 May.

Therapeutic Effect of Argatroban During Cardiopulmonary Resuscitation and Streptokinase During Extracorporeal Cardiopulmonary Resuscitation in a Porcine Model of Prolonged Cardiac Arrest.

VanZalen JJ(1), Harvey S(1), Hála P(1), Phillips A(1), Nakashima T(1)(2), Gok E(1), Tiba MH(2), McCracken BM(2), Hill JE(1), Liao J(2), Jung J(1), Mergos J(3), Stacey WC(4), Bartlett RH(1), Hsu CH(2), Rojas-Peña A(1)(5), Neumar RW(2).

ABSTRACT

Prolonged cardiac arrest (CA) causes microvascular thrombosis which is a potential barrier to organ reperfusion during extracorporeal cardiopulmonary resuscitation (ECPR). The aim of this study was to test the hypothesis that early intra-arrest anticoagulation during cardiopulmonary resuscitation (CPR) and thrombolytic therapy during ECPR improve recovery of brain and heart function in a porcine model of prolonged out-of-hospital CA. DESIGN: Randomized interventional trial. SETTING: University laboratory. SUBJECTS: Swine. INTERVENTIONS: In a blinded study, 48 swine were subjected to 8 minutes of ventricular fibrillation CA followed by 30 minutes of goal-directed CPR and 8 hours of ECPR. Animals were randomized into four groups (n = 12) and given either placebo (P) or argatroban (ARG; 350 mg/kg) at minute 12 of CA and either placebo (P) or streptokinase (STK, 1.5 MU) at the onset of ECPR. MEASUREMENTS AND MAIN RESULTS: Primary outcomes included recovery of cardiac function measured by cardiac resuscitability score (CRS: range 0-6) and recovery of brain function measured by the recovery of somatosensory-evoked potential (SSEP) cortical response amplitude. There were no significant differences in recovery of cardiac function as measured by CRS between groups (p = 0.16): P + P 2.3 (1.0); ARG + P = 3.4 (2.1); P + STK = 1.6 (2.0); ARG + STK = 2.9 (2.1). There were no significant differences in the maximum recovery of SSEP cortical response relative to baseline between groups (p = 0.73): P + P = 23% (13%); ARG + P = 20% (13%); P + STK = 25% (14%); ARG + STK = 26% (13%). Histologic analysis demonstrated reduced myocardial necrosis and neurodegeneration in the ARG + STK group relative to the P + P group. CONCLUSIONS: In this swine model of prolonged CA treated with ECPR, early intra-arrest anticoagulation during goal-directed CPR and thrombolytic therapy during ECPR did not improve initial recovery of heart and brain function but did reduce histologic evidence of ischemic injury. The impact of this therapeutic strategy on the long-term recovery of cardiovascular and neurological function requires further investigation.

CASE REPORTS

1. Ann Neurol. 2023 May;93(5):871-876. doi: 10.1002/ana.26619. Epub 2023 Mar 13.

Cardiac Arrest and Neurologic Recovery: Insights from the Case of Mr. Damar Hamlin.

Geocadin RG(1), Agarwal S(2), Goss AL(3), Callaway CW(4), Richie M(5).

ABSTRACT

The association between brain injury after cardiac arrest and poor survival outcomes has led to longstanding pessimism. However, the publicly witnessed cardiac arrest, resuscitation, and acute

management of Mr. Damar Hamlin and his favorable neurologic recovery provides some optimism. Mr. Hamlin's case highlights the neurologic advances of the last 2 decades and presents the opportunity to improve outcomes for all cardiac arrest patients in key areas: (1) effectively implementing the American Heart Association "Chain of Survival" to prevent initial brain injury and promote neuroprotection; (2) revisiting the process of neurologic prognostication and re-defining the brain recovery during the early periods, and (3) incorporating neurorehabilitation into existing cardiac rehabilitation models to support holistic recovery.

2. Cureus. 2023 Apr 11;15(4):e37436. doi: 10.7759/cureus.37436. eCollection 2023 Apr.
Nine-Second Cardiac Arrest in a Patient With Anti-mitochondrial Antibody-Positive Myopathy Under General Anesthesia.
Kitaura A(1), Yamamoto R(1), Tsukimoto S(1), Hamasaki S(1), Nakajima Y(1).
ABSTRACT
A small percentage of cases of dermatomyositis are positive for anti-mitochondrial antibodies (AMA), a known marker for primary biliary cirrhosis. AMA-positive myositis is a rare disease that has been reported to be accompanied by myocarditis, resulting in low left ventricular function, supraventricular arrhythmias, and abnormalities of the conduction system. We present a case of AMA-positive myocarditis resulting in sinus arrest during general anesthesia. A 66-year-old female with AMA-positive myocarditis underwent artificial femoral head replacement for osteonecrosis of the femoral head under general anesthesia. During general anesthesia, a nine-second sinus arrest occurred without any inducement. The sinus arrest was thought to be influenced by not only over-suppression caused by severe supraventricular tachycardia derived from sick sinus syndrome but sympathetic depression caused by general anesthesia. Because of the potential for life-threatening cardiovascular events during anesthesia in patients with AMA-positive myositis, it was considered essential to provide adequate preoperative management and intraoperative monitoring during anesthesia for patients with this disease. Herein, we report our case with a literature review.

3. JA Clin Rep. 2023 May 17;9(1):27. doi: 10.1186/s40981-023-00615-x.
A fragmented segment of a central venous catheter caused delayed ventricular fibrillation: a case report.
Takahashi K(1), Arai T(2), Asai T(2), Okuda Y(2).
ABSTRACT
BACKGROUND: Central venous port systems may be safely used for chemotherapy of patients with cancer, but several complications may occur associated with their use. CASE PRESENTATION: An 83-year-old man with heat stroke was transferred to our emergency department, where he was treated and became able to eat on the same day. He had been fit and healthy, except for colorectomy and chemotherapy using a central venous access port placed in the right upper jugular vein 8 years ago. The next day, he suddenly had ventricular fibrillation. Cardiopulmonary resuscitation was successful. Emergency coronary angiography showed a catheter-like foreign body in the coronary sinus. Physicians failed to remove the foreign body using catheter therapy, and ventricular fibrillation occurred repeatedly. After induction of general anesthesia, the fractured catheter was removed surgically. Postoperative course was uneventful. CONCLUSIONS: A fragmented segment of a catheter may suddenly cause ventricular fibrillation years later.