This week's PubMed 17th – 30th December 2023: articles of interest n = 81

CPR AND COVID-19

1. Am J Emerg Med. 2023 Nov 25;76:217-224. doi: 10.1016/j.ajem.2023.11.026. Online ahead of print.

Real-world comparison between mechanical and manual cardiopulmonary resuscitation during the COVID-19 pandemic.

Kim HJ(1), Lee D(2), Moon HJ(1), Jeong D(1), Shin TY(1), In Hong S(3), Lee HJ(1); Korean Cardiac Arrest Research Consortium (KoCARC) Investigators.

ABSTRACT

BACKGROUND: The COVID-19 pandemic has posed significant challenges to healthcare systems worldwide, including an increase in out-of-hospital cardiac arrests (OHCA). Healthcare providers are now required to use personal protective equipment (PPE) during cardiopulmonary resuscitation (CPR). Additionally, mechanical CPR devices have been introduced to reduce the number of personnel required for resuscitation. This study aimed to compare the outcomes of CPR performed with a mechanical device and the outcomes of manual CPR performed by personnel wearing PPE.METHODS: This multicenter observational study utilized data from the Korean Cardiac Arrest Research Consortium registry. The study population consisted of OHCA patients who underwent CPR in emergency departments (EDs) between March 2020 and June 2021. Patients were divided into two equal propensity score matched groups: mechanical CPR group (n = 421) and PPE-equipped manual CPR group (n = 421). Primary outcomes included survival rates and favorable neurological outcomes at discharge. Total CPR duration in the ED was also assessed. RESULTS: There were no significant between-group differences with respect to survival rate at discharge (mechanical CPR: 7.4% vs PPE-equipped manual CPR: 8.3%) or favorable neurological outcomes (3.3% vs. 3.8%, respectively). However, the mechanical CPR group had a longer duration of CPR in the ED compared to the manual CPR group. CONCLUSION: This study found no significant differences in survival rates and neurological outcomes between mechanical CPR and PPE-equipped manual CPR in the ED setting. However, a longer total CPR duration was observed in the mechanical CPR group. Further research is required to explore the impact of PPE on healthcare providers' performance and fatigue during CPR in the context of the pandemic and beyond.

2. Resuscitation. 2023 Dec 20:110096. doi: 10.1016/j.resuscitation.2023.110096. Online ahead of print.

What does the COVID-19 pandemic reveal about out-of-hospital cardiac arrest? Insights from the Canadian EMS response.

Johnson AM(1), Rosamond WD(2).

NO ABSTRACT AVAILABLE

3. Am J Emerg Med. 2023 Dec 23:S0735-6757(23)00703-9. doi: 10.1016/j.ajem.2023.12.024. Online ahead of print.

Impact of pandemic on use of mechanical chest compression systems.

Dabkowski M(1), Pruc M(2), Chirico F(3), Bragazzi NL(4), Szarpak L(5).

NO ABSTRACT AVAILABLE

CPR/MECHANICAL CHEST COMPRESSION

1. Sci Rep. 2023 Dec 20;13(1):22763. doi: 10.1038/s41598-023-49486-3.

Optimal chest compression position for cardiopulmonary resuscitation determined by computed tomography image: retrospective cross-sectional analysis.

Saksobhavivat N(1), Phattharapornjaroen P(2), Suksukon P(1), Atiksawedparit P(3), Chalermdamrichai P(2), Saelee R(4), Sanguanwit P(5).

ABSTRACT

The objective of this study was to determine the height of optimal hand position for chest compression during adult cardiopulmonary resuscitation (CPR) from the tip of the sternal xiphoid process (TOX) along with the relative heights of the left ventricular outflow tract (LVOT) and abdominal organs among the Thai population. The retrospective cross-sectional study was conducted through a review of medical records and contrast-enhanced chest computed tomography. The total of 204 Thai patients without obvious chest deformity at Ramathibodi Hospital from January to June 2018 was included as part of a multi-regional study. The heights of the level of maximal LV width (LVmax), LOVT, top of liver and stomach with respect to TOX were measured on midline sagittal image. Mean age and body mass index (BMI) were 59.5 years and 23.9 kg/m2, respectively. One hundred and one subjects (49.5%) had pulmonary diseases. Mean height of the LVmax from TOX was 37.7 mm, corresponding to 20% of the sternal length (SL) in the inspiration arm raised position (IAR). The adjusted height of LVmax from TOX in the expiration arm-down position (EAD) was 89.7 mm (48% of SL). The inter-nipple line was at 84.5 mm (45.1% of SL) from TOX on IAR. Among 178 and 109 subjects whose uppermost part of the liver and stomach were above TOX, 80.4% and 94.5% were located within the lower half of the sternum, respectively. The adjusted optimal hand position for chest compression during CPR was at approximately 89.7 mm from TOX in EAD (48% of SL). The hand position at the upper part of the lower half of the sternum is closest to the adjusted LVmax and has a better chance to avoid compression of intraabdominal organs.

REGISTRIES, REVIEWS AND EDITORIALS

1. Resuscitation. 2023 Dec 20:110099. doi: 10.1016/j.resuscitation.2023.110099. Online ahead of print.

Reply to: Stomach inflation during cardiopulmonary resuscitation in out-of-hospital cardiac arrest patients: Where did the air go?

Naito H(1), Hongo T(2), Yumoto T(2), Maeyama H(3), Nakao A(2).

NO ABSTRACT AVAILABLE

2. Front Med (Lausanne). 2023 Dec 1;10:1335398. doi: 10.3389/fmed.2023.1335398. eCollection 2023.

Editorial: Advances in the prevention and treatment of sudden cardiac death.

Schnaubelt S(1)(2), Baldi E(3)(4), Sulzgruber P(2)(5).

NO ABSTRACT AVAILABLE

3. Scand J Trauma Resusc Emerg Med. 2023 Dec 12;31(1):99. doi: 10.1186/s13049-023-01158-x.

Response to 'Chest compressions at altitude are of decreased quality, require more effort and cannot reliably be self-evaluated'.

Niederer M(1)(2)(3), Roth D(4), Egger A(5)(6).

NO ABSTRACT AVAILABE

4. Heart Lung. 2024 Jan-Feb;63:177. doi: 10.1016/j.hrtlng.2023.03.021. Epub 2023 Apr 3.
Reply to the comments on "Prevalence and related factors of do-not-resuscitate orders among in-hospital cardiac arrest patients".
Jiang T(1), Xu F(2).
NO ABSTRACT AVAILABLE

5. Resusc Plus. 2023 Dec 6;17:100511. doi: 10.1016/j.resplu.2023.100511. eCollection 2024 Mar.
Animal research in cardiac arrest.
Andersen LW(1)(2)(3)(4), Vammen L(1), Granfeldt A(1)(2).
ABSTRACT
The purpose of this narrative review is to provide an overview of lessons learned from experimental cardiac arrest studies, limitations, translation to clinical studies, ethical considerations and future directions. Cardiac arrest animal studies have provided valuable insights into the pathophysiology of cardiac arrest, the effects of various interventions, and the development of resuscitation techniques. However, there are limitations to animal models that should be considered when interpreting results. Systematic reviews have demonstrated that animal models rarely reflect the clinical condition seen in humans, nor the complex treatment that occurs during and after a cardiac arrest. Furthermore, animal models of cardiac arrest are at a significant risk of bias due to fundamental issues in performing and/or reporting critical methodological aspects. Conducting clinical trials targeting the management of rare cardiac arrest causes like e.g. hyperkalemia and pulmonary embolism is challenging due to the scarcity of eligible patients. For these research questions, animal models might provide the highest level of evidence and can potentially guide clinical practice. To continuously push cardiac arrest science forward, animal studies must be conducted and reported rigorously, designed to avoid bias and answer specific research questions. To ensure the continued relevance and generation of valuable new insights from animal studies, new approaches and techniques may be needed, including animal register studies, systematic reviews and multilaboratory trials.

6. Resuscitation. 2023 Dec 23:110100. doi: 10.1016/j.resuscitation.2023.110100. Online ahead of print.
Dissecting CPR.
Segal N(1).
NO ABSTRACT AVAILABLE

7. Hong Kong Med J. 2023 Dec;29(6):564-565. doi: 10.12809/hkmj219365. Epub 2023 Aug 23.
Survival of out-of-hospital cardiac arrest following a return of spontaneous circulation beyond 30 minutes.
Hon KL(1), Leung KKY(1), Chan KL(1), Hui WF(1), Chau KT(1), Qian SY(2).
NO ABSTRACT AVAILABLE

8. Resuscitation. 2023 Dec 26:110101. doi: 10.1016/j.resuscitation.2023.110101. Online ahead of print.
Cardiac power output: an old tool revisited as a new potential target for post-resuscitation care?
Geri G(1), Cariou A(2).
NO ABSTRACT AVAILABLE

IN-HOSPITAL CARDIAC ARREST

1. Intern Emerg Med. 2023 Dec 23. doi: 10.1007/s11739-023-03475-6. Online ahead of print.
Sepsis increases the risk of in-hospital cardiac arrest: a population-based analysis.
Liu Y(#)(1), Yo CH(#)(2), Hu JR(3), Hsu WT(4), Hsiung JC(5), Chang YH(6), Chen SC(7), Lee CC(8)(9).
ABSTRACT
Sepsis patients have a high risk of developing in-hospital cardiac arrest (IHCA), which portends poor survival. However, little is known about whether the increased incidence of IHCA is due to sepsis itself or to comorbidities harbored by sepsis patients. We conducted a retrospective population-based cohort study comprising 20,022 patients admitted with sepsis to hospitals in Taiwan using the National Health Insurance Research Database (NHIRD). We constructed three non-sepsis comparison cohorts using risk set sampling and propensity score (PS) matching. We used univariate conditional logistic regression to evaluate the risk of IHCA and associated mortality. We identified 12,790 inpatients without infection (matched cohort 1), 12,789 inpatients with infection but without sepsis (matched cohort 2), and 10,536 inpatients with end-organ dysfunction but without sepsis (matched cohort 3). In the three PS-matched cohorts, the odds ratios (OR) for developing ICHA were 21.17 (95% CI 17.19, 26.06), 18.96 (95% CI: 15.56, 23.10), and 1.23 (95% CI: 1.13, 1.33), respectively ($p < 0.001$ for all ORs). In conclusion, in our study of inpatients across Taiwan, sepsis was independently associated with an increased risk of IHCA. Further studies should focus on identifying the proxy causes of IHCA using real-time monitoring data to further reduce the incidence of cardiopulmonary insufficiency in patients with sepsis.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Resuscitation. 2023 Dec 15;194:110095. doi: 10.1016/j.resuscitation.2023.110095. Online ahead of print.
Prolonged follow-up after apparently unexplained sudden cardiac arrest: A retrospective study.
Giovachini L(1), Laghlam D(2), Geri G(3), Picard F(4), Varenne O(4), Marijon E(5), Dumas F(6), Cariou A(7).
ABSTRACT
BACKGROUND: We hypothesized that a prolonged follow-up of survivors of unexplained sudden cardiac arrest (USCA) would subsequently unmask electrical heart disorders in a significant proportion of cases. PATIENTS AND METHODS: We retrospectively analyzed all out-of-hospital cardiac arrest (OHCA) admitted alive in our cardiac arrest center over 20-years (2002-2022). The diagnosis of USCA was made when no etiology was found after thorough initial hospital investigations. We identified all the new diagnoses established during follow-up, and compared outcomes according to underlying heart diseases. RESULTS: Out of the 2482 OHCA patients, 68 (2.7%) were initially classified as USCA and 30 (1.2%) with electrical heart disorders. Compared to other cardiac etiologies of OHCA, both USCA and electrical heart disorders patients were younger (mean age 48.5 and 43.5 year-old respectively, versus 62.5 year-old; $p < 0.0001$), with a higher rate of family history of SCA (17.6 and 23.3% respectively versus 9.2%; $p = 0.003$). Six patients in each group were lost to follow-up at discharge (6/68, 8.8% in the USCA group, 6/30 20% in the electrical heart disorders group). During a mean follow-up of 8.1 ± 6.3 years, a diagnosis was eventually established in 24.3% of USCA patients (9/35), most of them as electrical heart disorders (55.6%, 5/9).

No post-discharge death occurred in both USCA and electrical heart disorders groups, with approximately 10% of appropriate therapy delivered by the implantable cardioverter defibrillator. CONCLUSION: Our findings emphasized that approximately a quarter of patients who had been initially considered as having apparently USCA after index hospital stay actually reveal heart conditions, especially electrical heart disorders.

2. Arrhythm Electrophysiol Rev. 2023 Nov 23;12:e27. doi: 10.15420/aer.2023.06. eCollection 2023.
Explaining the Unexplained: A Practical Approach to Investigating the Cardiac Arrest Survivor.
Suna G(1), Mellor GJ(1).

ABSTRACT

Sudden cardiac arrest (SCA) is a common cause of death. The majority of SCA is caused by ventricular arrhythmia due to underlying CHD. Aborted SCA with no apparent diagnosis after initial assessment with ECG, echocardiography and coronary assessment is referred to as unexplained cardiac arrest (UCA). Systematic evaluation of such patients may reveal a specific diagnosis in up to half of patients before a diagnosis of idiopathic VF is assigned. Specific diagnoses include inherited cardiac conditions, such as latent cardiomyopathies or inherited primary electrical disease. Identifying the cause of UCA is therefore not only critical for appropriate management of the SCA survivors to prevent recurrence, but also for their family members who may be at risk of the same condition. This review provides a tiered, systematic approach for the investigation of UCA.

END-TIDAL CO_2

1. Am J Emerg Med. 2023 Dec 7;77:77-80. doi: 10.1016/j.ajem.2023.11.030. Online ahead of print.
Utility of end-tidal carbon dioxide to guide resuscitation termination in prolonged out-of-hospital cardiac arrest.
Hambelton C(1), Wu L(2), Smith J(2), Thompson K(2), Neth MR(2), Daya MR(2), Jui J(2), Lupton JR(2).

ABSTRACT

STUDY OBJECTIVE: To evaluate if the change in end-tidal carbon dioxide (ETCO2) over time has improved discriminatory value for determining resuscitation futility compared to a single ETCO2 value in prolonged, refractory non-shockable out-of-hospital cardiac arrest (OHCA). METHODS: This is a retrospective analysis of adult refractory non-shockable, non-traumatic OHCA patients in the Portland Cardiac Arrest Epidemiologic Registry (PDX Epistry) from 2018 to 2021. We defined refractory non-shockable OHCA cases as patients with lack of a shockable rhythm at any time or return of spontaneous circulation at any time prior to 30-min of on-scene resuscitation. We abstracted ETCO2 values first recorded after advanced airway placement and nearest to the 30-min mark of on-scene resuscitation (30 min-ETCO2) from EMS charts. The primary outcome was survival to hospital discharge. We compared 30 min-ETCO2 cutoffs of 10 mmHg and 20 mmHg to the trend (increasing or not) from initial to 30 min-ETCO2 (delta-ETCO2) using sensitivity, specificity, and area under the receiver operating curves (AUROC). RESULTS: Of 3837 adult OHCA, 2850 were initially non-shockable, and there were 617 (16.1%) cases of refractory non-shockable OHCA at 30-min. We excluded 320 cases without at least two ETCO2 recordings in the EMS chart, leaving 297 cases that met inclusion criteria. Of these, 176 (59.3%) were transported and 2 (0.7%) survived to discharge. Using absolute 30 min-ETCO2 cutoffs, both survivors were in the >10 mmHg group (sensitivity 100.0%, specificity 12.5%), whereas only one survivor was identified in the >20 mmHg group (sensitivity 50.0%, specificity 32.5%). Using delta-ETCO2, both survivors were in the increasing ETCO2 group (sensitivity 100.0%, specificity 60.7%). In comparing the two tests that did not misclassify survivors, the AUROC [95% CI] was higher when using delta-ETCO2 (0.803 [0.775-0.831]) compared to an absolute cutoff of 10 mmHg (0.563 [0.544-0.582]). CONCLUSIONS: Nearly one-sixth of EMS-

treated adult OHCA patients had refractory non-shockable arrests after at least 30 min of ongoing resuscitation. In this group, the ETCO2 trend following advanced airway placement may be more accurate in guiding termination of resuscitation than an absolute ETCO2 cutoff of 10 or 20 mmHg.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

1. Crit Care. 2023 Dec 20;27(1):496. doi: 10.1186/s13054-023-04776-0.

Cumulative dose of epinephrine and mode of death after non-shockable out-of-hospital cardiac arrest: a registry-based study.

Javaudin F(1)(2)(3), Bougouin W(4)(5)(6)(7), Fanet L(4), Diehl JL(8)(9), Jost D(4)(5)(10), Beganton F(4)(5), Empana JP(4)(5), Jouven X(4)(5)(11), Adnet F(4)(5)(12), Lamhaut L(4)(5)(12), Lascarrou JB(4)(5)(7)(13), Cariou A(4)(5)(7)(14), Dumas F(4)(5)(15); Sudden Death Expertise Center investigators.

ABSTRACT

BACKGROUND: Epinephrine increases the chances of return of spontaneous circulation (ROSC) in out-of-hospital cardiac arrest (OHCA), especially when the initial rhythm is non-shockable. However, this drug could also worsen the post-resuscitation syndrome (PRS). We assessed the association between epinephrine use during cardiopulmonary resuscitation (CPR) and subsequent intensive care unit (ICU) mortality in patients with ROSC after non-shockable OHCA. METHODS: We used data prospectively collected in the Sudden Death Expertise Center (SDEC) registry (capturing OHCA data located in the Greater Paris area, France) between May 2011 and December 2021. All adults with ROSC after medical, cardiac and non-cardiac causes, non-shockable OHCA admitted to an ICU were included. The mode of death in the ICU was categorized as cardiocirculatory, neurological, or other. RESULTS: Of the 2,792 patients analyzed, there were 242 (8.7%) survivors at hospital discharge, 1,004 (35.9%) deaths from cardiocirculatory causes, 1,233 (44.2%) deaths from neurological causes, and 313 (11.2%) deaths from other etiologies. The cardiocirculatory death group received more epinephrine (4.6 ± 3.8 mg versus 1.7 ± 2.8 mg, 3.2 ± 2.6 mg, and 3.5 ± 3.6 mg for survivors, neurological deaths, and other deaths, respectively; $p < 0.001$). The proportion of cardiocirculatory death increased linearly ($R2 = 0.92$, $p < 0.001$) with cumulative epinephrine doses during CPR (17.7% in subjects who did not receive epinephrine and 62.5% in those who received > 10 mg). In multivariable analysis, a cumulative dose of epinephrine was strongly associated with cardiocirculatory death (adjusted odds ratio of 3.45, 95% CI [2.01-5.92] for 1 mg of epinephrine; 12.28, 95% CI [7.52-20.06] for 2-5 mg; and 23.71, 95% CI [11.02-50.97] for > 5 mg; reference 0 mg; population reference: alive at hospital discharge), even after adjustment on duration of resuscitation. The other modes of death (neurological and other causes) were also associated with epinephrine use, but to a lesser extent. CONCLUSIONS: In non-shockable OHCA with ROSC, the dose of epinephrine used during CPR is strongly associated with early cardiocirculatory death. Further

clinical studies aimed at limiting the dose of epinephrine during CPR seem warranted. Moreover, strategies for the prevention and management of PRS should take this dose of epinephrine into consideration for future trials.

2. Intensive Care Med. 2023 Dec;49(12):1514-1516. doi: 10.1007/s00134-023-07267-6. Epub 2023 Nov 20.
Should we give steroids after out-of-hospital cardiac arrest?
Anstey MH(1)(2)(3), de Jong A(4), Skrifvars MB(5).
NO ABSTRACT AVAILABLE

3. Am J Emerg Med. 2023 Dec 10;77:72-76. doi: 10.1016/j.ajem.2023.12.003. Online ahead of print.
Risk of arrhythmia in post-resuscitative shock after out-of-hospital cardiac arrest with epinephrine versus norepinephrine.
Normand S(1), Matthews C(2), Brown CS(3), Mattson AE(3), Mara KC(4), Bellolio F(5), Wieruszewski ED(3).
ABSTRACT
OBJECTIVE: To determine the rates of clinically significant tachyarrhythmias and mortality in the management of post-resuscitative shock after return of spontaneous circulation (ROSC) in patients with out-of-hospital cardiac arrest (OHCA) who receive a continuous epinephrine versus norepinephrine infusion. DESIGN: Retrospective cohort study. SETTING: A large multi-site health system with hospitals across the United States. PATIENTS: Adult patients admitted for OHCA with post-resuscitative shock managed with either epinephrine or norepinephrine infusions within 6 h of ROSC. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Between May 5th, 2018, to January 31st, 2022, there were 221 patients admitted for OHCA who received post-resuscitative epinephrine or norepinephrine infusions. There was no difference in the rate of tachyarrhythmias between epinephrine and norepinephrine infusion in univariate (47.1% vs 41.7%, OR 1.24, 95% CI 0.71-2.20) or multivariable analysis (OR 1.34, 95% CI 0.68-2.62). Patients treated with epinephrine were more likely to die during hospitalization than those treated with norepinephrine (90.0% vs 54.3%, OR 6.21, 95% CI 2.37-16.25, $p < 0.001$). Epinephrine treated patients were more likely to have re-arrest during hospital admission (55.7% vs 14.6%, OR 5.77, 95% CI 2.74-12.18, $p < 0.001$). CONCLUSION: There was no statistically significant difference in clinically significant cardiac tachyarrhythmias in post-OHCA patients treated with epinephrine versus norepinephrine infusions after ROSC. Re-arrest rates and in-hospital mortality were higher in patients who received epinephrine infusions in the first 6 h post-ROSC. Results of this study add to the literature suggesting norepinephrine may be the vasopressor of choice in post-OHCA patients with post-resuscitative shock after ROSC.

4. Resuscitation. 2023 Dec 15;194:110094. doi: 10.1016/j.resuscitation.2023.110094. Online ahead of print.
Impact of blood pressure targets on central hemodynamics during intensive care after out-of-hospital cardiac arrest.
Grand J(1), Møller JE(2), Hassager C(3), Schmidt H(4), Mølstrøm S(4), Boesgaard S(5), Meyer MAS(5), Josiassen J(5), Højgaard HF(4), Frydland M(5), Dahl JS(6), Obling LER(5), Bak M(4), Lind Jørgensen V(7), Thomsen JH(5), Wiberg S(8), Madsen SA(7), Nyholm B(5), Kjaergaard J(3).
ABSTRACT
OBJECTIVES: The aim was to investigate the advanced hemodynamic effects of the two MAP-targets during intensive care on systemic hemodynamics in comatose patients after cardiac arrest. DESIGN: Secondary analysis of a randomized controlled trial. SETTING: Primary vasopressor used was per

protocol norepinephrine. Hemodynamic monitoring was done with pulmonary artery catheters (PAC) and measurements were made on predefined time points. The primary endpoint of this substudy was the difference in cardiac index within 48 h from a repeated measurements-mixed model. Secondary endpoints included systemic vascular resistance index (SVRI), heart rate, and stroke volume index. PATIENTS: Comatose survivors after out-of-hospital cardiac arrest. INTERVENTIONS: The "Blood pressure and oxygenations targets after out-of-hospital cardiac arrest (BOX)"-trial was a randomized, controlled, double-blinded, multicenter-study comparing targeted mean arterial pressure (MAP) of 63 mmHg (MAP63) vs 77 mmHg (MAP77). MEASUREMENTS AND MAIN RESULTS: Among 789 randomized patients, 730 (93%) patients were included in the hemodynamic substudy. From PAC-insertion (median 1 hours after ICU-admission) and the next 48 hours, the MAP77-group received significantly higher doses of norepinephrine (mean difference 0.09 µg/kg/min, 95% confidence interval (CI) 0.07-0.11, pgroup < 0.0001). Cardiac index was significantly increased (0.20 L/min/m2 (CI 0.12-0.28), pgroup < 0.0001) as was SVRI with an overall difference of (43 dynes m2/s/cm5 (CI 7-79); pgroup = 0.02). Heart rate was increased in the MAP77-group (4 beats/minute; CI 2-6, pgroup < 0.003), but stroke volume index was not (pgroup = 0.10). CONCLUSIONS: Targeted MAP at 77 mmHg compared to 63 mmHg resulted in a higher dose of norepinephrine, increased cardiac index and SVRI. Heart rate was also increased, but stroke volume index was not affected by a higher blood pressure target.

5. Am J Emerg Med. 2023 Dec 14:S0735-6757(23)00691-5. doi: 10.1016/j.ajem.2023.12.013. Online ahead of print.
Reevaluating the efficacy of corticosteroid therapy in cardiac arrest: Insights from a trial sequential analysis.
Chen IW(1), Lin HJ(2), Hung KC(3).
NO ABSTRACT AVAILABLE

6. J Am Heart Assoc. 2023 Dec 29:e9138. doi: 10.1161/JAHA.123.030776. Online ahead of print.
Hemodynamic Effect of Repeated Epinephrine Doses Decreases With Cardiopulmonary Resuscitation Cycle Progression.
Roh YI(1)(2), Ahn GJ(1)(2), Lee JH(1), Jung WJ(1)(2), Kim S(3), Im HY(2), Lee Y(2), Im D(2), Lim J(4), Hwang SO(1)(2), Cha KC(1)(2).
ABSTRACT
BACKGROUND: Epinephrine is administered to increase coronary perfusion pressure during advanced life support and promote short-term survival. Recent cardiopulmonary resuscitation (CPR) guidelines recommend an epinephrine dosing interval of 3 to 5 minutes during resuscitation; however, scientific evidence supporting this recommendation is lacking. Therefore, we aimed to investigate the hemodynamic effects of repeated epinephrine doses during CPR by monitoring augmented blood pressure after its administration in a swine model of cardiac arrest. METHODS AND RESULTS: A secondary analysis of data from a published study was performed using a swine cardiac arrest model. The epinephrine dose was fixed at 1 mg, and the first dose of epinephrine was administered after no-flow and low-flow times of 2 minutes and 8 minutes, respectively, and subsequently administered every 4 minutes. Four cycles of dosing intervals were defined because a previous study was terminated 26 minutes after the induction of ventricular fibrillation. Augmented blood pressures and corresponding timelines were determined. Augmented blood pressure trends following cycles and the epinephrine effect duration were also monitored. Among the 140 CPR cycles, the augmented blood pressure after epinephrine administration was the highest during the first cycle of CPR and decreased gradually with further cycle repetitions. The epinephrine effect duration did not differ between repeated cycles. The maximum blood pressure was achieved 78 to

97 seconds after epinephrine administration. CONCLUSIONS: Hemodynamic augmentation with repeated epinephrine administration during CPR decreased with cycle progression. Further studies are required to develop an epinephrine administration strategy to maintain its hemodynamic effects during prolonged resuscitation.

7. Am J Emerg Med. 2023 Dec 21;77:158-163. doi: 10.1016/j.ajem.2023.12.031. Online ahead of print.

Norepinephrine versus epinephrine for hemodynamic support in post-cardiac arrest shock: A systematic review.

Lawson CK(1), Faine BA(2), Rech MA(3), Childs CA(4), Brown CS(5), Slocum GW(6), Acquisto NM(7), Ray L(8); EMPHARM-NET Study Group.

ABSTRACT

PURPOSE: The preferred vasopressor in post-cardiac arrest shock has not been established with robust clinical outcomes data. Our goal was to perform a systematic review and meta-analysis comparing rates of in-hospital mortality, refractory shock, and hemodynamic parameters in post-cardiac arrest patients who received either norepinephrine or epinephrine as primary vasopressor support. METHODS: We conducted a search of PubMed, Cochrane Library, and CINAHL from 2000 to 2022. Included studies were prospective, retrospective, or published abstracts comparing norepinephrine and epinephrine in adults with post-cardiac arrest shock or with cardiogenic shock and extractable post-cardiac arrest data. The primary outcome of interest was in-hospital mortality. Other outcomes included incidence of arrhythmias or refractory shock. RESULTS: The database search returned 2646 studies. Two studies involving 853 participants were included in the systematic review. The proposed meta-analysis was deferred due to low yield. Crude incidence of in-hospital mortality was numerically higher in the epinephrine group compared with norepinephrine in both studies, but only statistically significant in one. Risk of bias was moderate to severe for in-hospital mortality. Additional outcomes were reported differently between studies, minimizing direct comparison. CONCLUSION: The vasopressor with the best mortality and hemodynamic outcomes in post-cardiac arrest shock remains unclear. Randomized studies are crucial to remedy this.

TRAUMA

No articles identified.

VENTILATION

1. Resuscitation. 2023 Dec;193:109991. doi: 10.1016/j.resuscitation.2023.109991. Epub 2023 Oct 5.

Association of small adult ventilation bags with return of spontaneous circulation in out of hospital cardiac arrest.

Snyder BD(1), Van Dyke MR(2), Walker RG(3), Latimer AJ(2), Grabman BC(4), Maynard C(5), Rea TD(2), Johnson NJ(2), Sayre MR(6), Counts CR(6).

ABSTRACT

INTRODUCTION: Little is known about the impact of tidal volumes delivered by emergency medical services (EMS) to adult patients with out-of-hospital cardiac arrest (OHCA). A large urban EMS system changed from standard adult ventilation bags to small adult bags. We hypothesized that the incidence of return of spontaneous circulation (ROSC) at the end of EMS care would increase after this change. METHODS: We performed a retrospective analysis evaluating adults treated with advanced airway placement for nontraumatic OHCA between January 1, 2015 and December 31, 2021. We compared rates of ROSC, ventilation rate, and mean end tidal carbon dioxide (ETCO2) by

minute before and after the smaller ventilation bag implementation using linear and logistic regression. RESULTS: Of the 1,994 patients included, 1,331 (67%) were treated with a small adult bag. ROSC at the end of EMS care was lower in the small bag cohort than the large bag cohort, 33% vs 40% (p = 0.003). After adjustment, small bag use was associated with lower odds of ROSC at the end of EMS care [OR 0.74, 95% CI 0.61 - 0.91]. Ventilation rates did not differ between cohorts. ETCO2 values were lower in the large bag cohort (33.2 ± 17.2 mmHg vs. 36.9 ± 19.2 mmHg, p < 0.01). CONCLUSION: Use of a small adult bag during OHCA was associated with lower odds of ROSC at the end of EMS care. The effects on acid base status, hemodynamics, and delivered minute ventilation remain unclear and warrant additional study.

2. Prehosp Emerg Care. 2023 Dec 22:1-13. doi: 10.1080/10903127.2023.2281363. Online ahead of print.

Evidence-Based Guideline for Prehospital Airway Management.

Jarvis JL(1), Panchal AR(2), Lyng JW(3), Bosson N(4), Donofrio-Odmann JJ(5), Braude DA(6), Browne LR(7), Arinder M(8), Bolleter S(9), Gross T(10), Levy M(11), Lindbeck G(2), Maloney LM(12), Mattera CJ(11), Wang CT(13), Crowe RP(14), Gage CB(15), Lang ES(16), Sholl JM(2).

ABSTRACT

Airway management is a cornerstone of emergency medical care. This project aimed to create evidence-based guidelines based on the systematic review recently conducted by the Agency for Healthcare Research and Quality (AHRQ). A technical expert panel was assembled to review the evidence using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology. The panel made specific recommendations on the different PICO (population, intervention, comparison, outcome) questions reviewed in the AHRQ review and created good practice statements that summarize and operationalize these recommendations. The recommendations address the use of ventilation with bag-valve mask ventilation alone vs. supraglottic airways vs. endotracheal intubation for adults and children with cardiac arrest, medical emergencies, and trauma. Additional recommendations address the use of video laryngoscopy and drug-assisted airway management. These recommendations, and the associated good practice statements, offer EMS agencies and clinicians an opportunity to review the available evidence and incorporate it into their airway management strategies.

3. Arch Argent Pediatr. 2024 Jan 4:e202310172. doi: 10.5546/aap.2023-10172.eng. Online ahead of print.

Airway management during a respiratory arrest in a clinical simulation scenario. Experience at a pediatric residency program.

[Article in English, Spanish; Abstract available in Spanish from the publisher]

Lomez J(1), Rodríguez MB(1), Rigou S(1), Rojas S(1), Torterola P(1), Fortini Cabarcos N(1), Elias Costa C(1), Enriquez D(1).

ABSTRACT

Introduction. Respiratory failure is the most common cause of cardiac arrest in pediatrics. Recognizing and managing it adequately is critical. Simulation is used to improve medical skills. The objective of this study was to establish the proportion of pediatric residents who recognized a respiratory arrest in a child at a simulation center. Methods. This was an observational study in 77 residents. A simulation of a patient with respiratory distress that progressed to respiratory arrest was used. Results. Among the 77 participants, 48 recognized respiratory arrest (62.3%). The mean time to recognize respiratory arrest was 38.16 seconds. Conclusion. Respiratory arrest was recognized by 62.3% of participants. Among those who did so, the average time was 38.16 seconds. Severe failures were noted in some of the expected interventions.

4. Acute Med Surg. 2023 Dec 26;10(1):e912. doi: 10.1002/ams2.912. eCollection 2023 Jan-Dec.

Effect of prehospital advanced airway management on out-of-hospital cardiac arrest due to asphyxia: A JAAM-OHCA registry-based observational study in Japan.

Bunya N(1), Hirofumi O(2), Igarashi Y(3), Norii T(4), Katayama Y(1), Kasai T(1), Sawamoto K(1), Narimatsu E(1).

ABSTRACT

AIM: To investigate the relationship between prehospital advanced airway management (AAM) and neurological outcomes in patients with asphyxia-related out-of-hospital cardiac arrest (OHCA). METHODS: We retrospectively analyzed data from the Japanese Association for Acute Medicine OHCA registry between June 2014 and December 2017. Patients with asphyxia-related cardiac arrest aged ≥18 years were included. The primary outcome was a 1-month favorable neurological outcome (cerebral performance category [CPC] 1-2). RESULTS: Of the 34,754 patients in the 2014-2017 JAAM-OHCA Registry, 1956 were included in our analysis. Cerebral performance category 1-2 was observed in 31 patients (1.6%), while CPC 3-5 was observed in 1925 patients (98.4%). Although prehospital AAM was associated with unfavorable neurological outcomes (odds ratio [OR], 0.269; 95% confidence interval [CI], 0.114-0.633; p = 0.003) in the univariate analysis, the association was not significant in the multivariate analysis. Compared with the AAM group, the non-AAM group showed increased rates of cardiac arrest after emergency medical service contact (4.3 vs. 7.2%, p = 0.009) and Glasgow Coma Scale ≥4 at hospital admission (1.9% vs. 4.7%, p = 0.004). Among the 903 patients for whom the time to return of spontaneous circulation (ROSC) could be calculated, the time from witnessed cardiac arrest to ROSC was significantly shorter (median, 8.5 vs. 37.0 min; p < 0.001) for those with favorable neurological outcomes than for those without. CONCLUSION: Prehospital AAM is not associated with improved neurological outcomes among those with asphyxia-related OHCA. However, the time from cardiac arrest to the first ROSC was significantly shorter among those with favorable outcomes.

CERERBRAL MONITORING

No articles identified.

ULTRASOUND AND CPR

1. Medicina (Kaunas). 2023 Dec 15;59(12):2179. doi: 10.3390/medicina59122179.

Point-of-Care Ultrasound-History, Current and Evolving Clinical Concepts in Emergency Medicine.

Osterwalder J(1), Polyzogopoulou E(2), Hoffmann B(3).

ABSTRACT

Point-of-care ultrasound (PoCUS) has become an indispensable standard in emergency medicine. Emergency medicine ultrasound (EMUS) is the application of bedside PoCUS by the attending emergency physician to assist in the diagnosis and management of many time-sensitive health emergencies. In many ways, using PoCUS is not only the mere application of technology, but also a fusion of already existing examiner skills and technology in the context of a patient encounter. EMUS practice can be defined using distinct anatomy-based applications. The type of applications and their complexity usually depend on local needs and resources, and practice patterns can vary significantly among regions, countries, or even continents. A different approach suggests defining EMUS in categories such as resuscitative, diagnostic, procedural guidance, symptom- or sign-based, and therapeutic. Because EMUS is practiced in a constantly evolving emergency medical setting where no two patient encounters are identical, the concept of EMUS should also be practiced in a fluid, constantly adapting manner driven by the physician treating the patient. Many recent advances in ultrasound technology have received little or no attention from the EMUS community, and several

important technical advances and research findings have not been translated into routine clinical practice. The authors believe that four main areas have great potential for the future growth and development of EMUS and are worth integrating: 1. In recent years, many articles have been published on novel ultrasound applications. Only a small percentage has found its way into routine use. We will discuss two important examples: trauma ultrasound that goes beyond e-FAST and EMUS lung ultrasound for suspected pulmonary embolism. 2. The more ultrasound equipment becomes financially affordable; the more ultrasound should be incorporated into the physical examination. This merging and possibly even replacement of aspects of the classical physical exam by technology will likely outperform the isolated use of stethoscope, percussion, and auscultation. 3. The knowledge of pathophysiological processes in acute illness and ultrasound findings should be merged in clinical practice. The translation of this knowledge into practical concepts will allow us to better manage many presentations, such as hypotension or the dyspnea of unclear etiology. 4. Technical innovations such as elastography; CEUS; highly sensitive color Doppler such as M-flow, vector flow, or other novel technology; artificial intelligence; cloud-based POCUS functions; and augmented reality devices such as smart glasses should become standard in emergencies over time.

2. Resuscitation. 2023 Dec 16;194:110089. doi: 10.1016/j.resuscitation.2023.110089. Online ahead of print.

Live stream of prehospital point-of-care ultrasound during cardiopulmonary resuscitation - A feasibility trial.

Hafner C(1), Manschein V(2), Klaus DA(2), Schaubmayr W(2), Tiboldi A(2), Scharner V(2), Gleiss A(3), Thal B(4), Krammel M(5), Hamp T(6), Willschke H(1), Hermann M(7).

ABSTRACT

BACKGROUND: Current resuscitation guidelines recommend that skilled persons could use ultrasound to detect reversible causes during cardiopulmonary resuscitation (CPR) where the examination can be safely integrated into the Advanced Life Support (ALS) algorithm. However, in a prehospital setting performing and rapidly interpreting ultrasound can be challenging for physicians. Implementing remote, expert-guided, and real-time transmissions of ultrasound examinations offers the opportunity for tele-support, even during an out-of-hospital cardiac arrest (OHCA). The aim of this feasibility study was to evaluate the impact of tele-supported ultrasound in ALS on hands-off time during an OHCA. METHODS: In an urban setting, physicians performed point-of-care ultrasound (POCUS) on patients during OHCA using a portable device, either with tele-support (n = 30) or without tele-support (n = 12). Where tele-support was used, the ultrasound image was transmitted via a remote real-time connection to an on-call specialist in anaesthesia and intensive care medicine with an advanced level of critical care ultrasound expertise. The primary safety endpoint of this study was to evaluate whether POCUS can be safely integrated into the algorithm, and to provide an analysis of hands-off time before, during, and after POCUS during OHCA. RESULTS: In all 42 cases it was possible to perform POCUS during regular rhythm analyses, and no additional hands-off time was required. In 40 of these 42 cases, the physicians were able to perform POCUS during a single regular rhythm analysis, with two periods required only in two cases. The median hands-off time during these rhythm analyses for POCUS with tele-support was 10 (8-13) seconds, and 11 (9-14) seconds for POCUS without tele-support. Furthermore, as a result of POCUS, in a quarter of all cases the physician on scene altered their diagnosis of the primary suspected cause of cardiac arrest, leading to a change in treatment strategy. CONCLUSIONS: This feasibility study demonstrated that POCUS with tele-support can be safely performed during OHCA in an urban environment.

ORGANISATION AND TRAINING

1. Scand J Trauma Resusc Emerg Med. 2023 Dec 20;31(1):105. doi: 10.1186/s13049-023-01152-3.
Automated and app-based activation of first responders for prehospital cardiac arrest: an analysis of 16.500 activations of the KATRETTER system in Berlin.
Pommerenke C(#)(1), Poloczek S(#)(2), Breuer F(3), Wolff J(4), Dahmen J(5).
ABSTRACT
BACKGROUND: Bystander CPR is one of the main independent factors contributing to better survival after out-of-hospital cardiac arrest. Simultaneously, the rate of bystander CPR in Germany is below the European average. First responder applications (apps) contribute to reducing the time period without CPR (no-flow time) until professional help can arrive on-scene. METHODS: The KATRETTER app was introduced in Berlin as one of the first apps in Europe which do not require any medical qualifications to register as a first responder. The activation of volunteer first responders for suspected cardiac arrest cases through the Berlin Emergency Medical Services integrated control center was evaluated based on data collected between 16 Oct 2020 and 16 Oct 2022. Our descriptive analysis includes the number of registered first responders, number of activations, the number and percentages of accepted activations, as well as all reports where first responders arrived at the scene. RESULTS: As of 15 Oct 2022, a total of 10,102 first responders were registered in the state of Berlin. During this specified period, there were 16.505 activations of the system for suspected out-of-hospital cardiac arrest. In 38.4% of the accepted cases, first responders documented patient contact, and in 34.6% of cases with patient contact, CPR was performed. Only 2% of registered first responders did not have any medical qualifications. CONCLUSIONS: Smartphone-based first responder applications should not be understood as a means of alerting professional help, but rather like a digitally amplified "call for help" in the vicinity of an emergency location. A large number of first responders can be recruited within 24 months, without large-scale public relations work necessary. No qualifications were required to become a first responder, contributing to a low-threshold registration process with the effect of a more widespread distribution of the app and cost reduction during implementation.

2. Resuscitation. 2023 Dec;193:109954. doi: 10.1016/j.resuscitation.2023.109954. Epub 2023 Sep 1.
Agency factors associated with first response systems that improve out-of-hospital cardiac arrest outcomes.
Huebinger R(1), Spring M(2), McNally B(3), Humphries A(4), Persse D(5), Diggs D(6), Boerwinkle E(7), Bobrow B(8); CARES Surveillance Group.
ABSTRACT
BACKGROUND: Data are conflicting regarding the association between first responder (FR) intervention and improved outcomes after out-of-hospital cardiac arrest (OHCA). We evaluated characteristics of agencies that have positive associations between FR interventions and outcomes. METHODS: We analyzed the 2016-2021 national Cardiac Arrest Registry to Enhance Survival (CARES). We defined the exposures as FR CPR and AED. The outcome was survival with favorable neurologic status. We used logistic regression models to evaluate the association between FR interventions with OHCA outcome for each agency, stratifying agencies into positive association (95% confidence interval above 1) and no/inverse association (95% confidence below or including 1). We compared characteristics between cohorts. RESULTS: For the association between FR CPR and outcomes, 21 agencies caring for 42,856 OHCAs had a positive association; 371 agencies caring for 449,824 OHCAs had no association. For FR AED, 47 agencies caring for 103,120 OHCAs had a positive association; 262 agencies caring for 327,761 OHCAs had no association. Comparing agency characteristics for FR CPR, agencies with a positive association had more annual OHCAs (+300), lower FR CPR rate (-11.3%), and lower FR AED rate (-10.8%). Comparing FR AED, agencies with a positive association had

more OHCAs per year (+150.5), lower FR CPR rate (-6.8%), lower FR AED rate (-13.3%), lower response time (-0.6 minutes), and more OHCAs from high-income neighborhoods (+3.7%). CONCLUSION: FR AED more commonly had a positive association with outcomes than FR CPR. Agencies with better outcomes from FR interventions treated more OHCAs and had lower rates of FR intervention.

3. Resuscitation. 2023 Dec;193:109956. doi: 10.1016/j.resuscitation.2023.109956. Epub 2023 Sep 1.
Early and late withdrawal of life-sustaining treatment after out-of-hospital cardiac arrest in the United Kingdom: Institutional variation and association with hospital mortality.
Vlachos S(1), Rubenfeld G(2), Menon D(3), Harrison D(4), Rowan K(5), Maharaj R(6).
ABSTRACT
AIM: Frequency and timing of Withdrawal of Life-Sustaining Treatment (WLST) after Out-of-Hospital Cardiac Arrest (OHCA) vary across Intensive Care Units (ICUs) in the United Kingdom (UK) and may be a marker of lower healthcare quality if instituted too frequently or too early. We aimed to describe WLST practice, quantify its variability across UK ICUs, and assess the effect of institutional deviation from average practice on patients' risk-adjusted hospital mortality. METHODS: We conducted a retrospective multi-centre cohort study including all adult patients admitted after OHCA to UK ICUs between 2010 and 2017. We identified patient and ICU characteristics associated with early (within 72 h) and late (>72 h) WLST and quantified the between-ICU variation. We used the ICU-level observed-to-expected (O/E) ratios of early and late-WLST frequency as separate metrics of institutional deviation from average practice and calculated their association with patients' hospital mortality. RESULTS: We included 28,438 patients across 204 ICUs. 10,775 (37.9%) had WLST and 6397 (59.4%) of them had early-WLST. Both WLST types were strongly associated with patient-level demographics and pre-existing conditions but weakly with ICU-level characteristics. After adjustment, we found unexplained between-ICU variation for both early-WLST (Median Odds Ratio 1.59, 95%CrI 1.49-1.71) and late-WLST (MOR 1.39, 95%CrI 1.31-1.50). Importantly, patients' hospital mortality was higher in ICUs with higher O/E ratio of early-WLST (OR 1.29, 95%CI 1.21-1.38, $p < 0.001$) or late-WLST (OR 1.39, 95%CI 1.31-1.48, $p < 0.001$). CONCLUSIONS: Significant variability exists between UK ICUs in WLST frequency and timing. This matters because unexplained higher-than-expected WLST frequency is associated with higher hospital mortality independently of timing, potentially signalling prognostic pessimism and lower healthcare quality.

4. Intern Emerg Med. 2023 Dec 21. doi: 10.1007/s11739-023-03487-2. Online ahead of print.
Logistic and cognitive-emotional barriers experienced by first responders when alarmed to get dispatched to out-of-hospital cardiac arrest events: a region-wide survey.
Gamberini L(1), Del Giudice D(2), Tartaglione M(3), Allegri D(4), Coniglio C(1), Pastori A(5), Gordini G(1), Semeraro F(1); Giulio Bernardini; Simone Baroncini; Adriano Furlan; Andrea Fransceschini; Fabio Mora.
ABSTRACT
Out-of-hospital cardiac arrest (OHCA) is a major public health concern with low survival rates. First responders (FRs) and public access defibrillation (PAD) programs can significantly improve survival, although barriers to response activation persist. The Emilia Romagna region in Italy has introduced a new system, the DAE RespondER App, to improve the efficiency of FR dispatch in response to OHCA. The study aimed to evaluate the association between different logistic factors, FRs' perceptions, and their decision to accept or decline dispatch to an OHCA scene using the DAE RespondER App. A cross-sectional web survey was conducted, querying 14,518 registered FRs using the DAE RespondER app in Emilia Romagna. The survey explored logistic and cognitive-emotional perceptions towards barriers in responding to OHCAs. Statistical analysis was conducted, with responses adjusted using

non-response weights. 4,644 responses were obtained (32.0% response rate). Among these, 1,824 (39.3%) had received at least one dispatch request in the past year. Multivariable logistic regression showed that being male, having previous experience with OHCA situations, and having an automated external defibrillator (AED) available at the moment of the call were associated with a higher probability of accepting the dispatch. Regarding FRs' perceptions, logistic obstacles were associated with mission rejection, while higher scores in cognitive-emotional obstacles were associated with acceptance. The study suggests that both logistical and cognitive-emotional factors are associated with FRs' decision to accept a dispatch. Addressing these barriers and further refining the DAE RespondER App can enhance the effectiveness of PAD programs, potentially improving survival rates for OHCA. The insights from this study can guide the development of interventions to improve FR participation and enhance overall OHCA response systems.

5. Eur J Emerg Med. 2024 Feb 1;31(1):59-67. doi: 10.1097/MEJ.0000000000001094. Epub 2023 Oct 2.

Ambulance response times and 30-day mortality: a Copenhagen (Denmark) registry study.

Mills AAM(1), Mills EHA(2), Blomberg SNF(3), Christensen HC(3)(4), Møller AL(5)(6)(7), Gislason G(8)(9)(10), Køber L(11), Kragholm KH(12)(13), Lippert F(3), Folke F(3)(9)(14), Andersen MP(6), Torp-Pedersen C(6)(7).

ABSTRACT

BACKGROUND AND IMPORTANCE: Ensuring prompt ambulance responses is complicated and costly. It is a general conception that short response times save lives, but the actual knowledge is limited. OBJECTIVE: To examine the association between the response times of ambulances with lights and sirens and 30-day mortality. DESIGN: A registry-based cohort study using data collected from 2014-2018. SETTINGS AND PARTICIPANTS: This study included 182 895 individuals who, during 2014-2018, were dispatched 266 265 ambulances in the Capital Region of Denmark. OUTCOME MEASURES AND ANALYSIS: The primary outcome was 30-day mortality. Subgroup analyses were performed on out-of-hospital cardiac arrests, ambulance response priority subtypes, and caller-reported symptoms of chest pain, dyspnoea, unconsciousness, and traffic accidents. The relation between variables and 30-day mortality was examined with logistic regression. RESULTS: Unadjusted, short response times were associated with higher 30-day mortality rates across unadjusted response time quartiles (0-6.39 min: 9%; 6.40-8.60 min: 7.5%, 8.61-11.80 min: 6.6%, >11.80 min: 5.5%). This inverse relationship was consistent across subgroups, including chest pain, dyspnoea, unconsciousness, and response priority subtypes. For traffic accidents, no significant results were found. In the case of out-of-hospital cardiac arrests, longer response times of up to 10 min correlated with increased 30-day mortality rates (0-6.39 min: 84.1%; 6.40-8.60 min: 86.7%, 8.61-11.8 min: 87.7%, >11.80 min: 85.5%). Multivariable-adjusted logistic regression analysis showed that age, sex, Charlson comorbidity score, and call-related symptoms were associated with 30-day mortality, but response time was not (OR: 1.00 (95% CI [0.99-1.00])). CONCLUSION: Longer ambulance response times were not associated with increased mortality, except for out-of-hospital cardiac arrests.

6. J Interprof Care. 2023 Dec 21:1-9. doi: 10.1080/13561820.2023.2289507. Online ahead of print.

When routine becomes stressful: A qualitative study into resuscitation team members' perception of stress and performance.

Dijkstra FS(1)(2), de la Croix A(3)(4), van Schuppen H(5), Meeter M(2)(4), Renden PG(6)(7).

ABSTRACT

Interprofessional teamwork is of high importance during stressful situations such as CPR. Stress can potentially influence team performance. This study explores the perception of stress and its stressors during performance under pressure, to be able to further adjust or develop training.

Healthcare professionals, who are part of the resuscitation team in a large Dutch university medical center, discussed their experiences in homogeneous focus groups. Nine focus groups and one individual interview were conducted and analyzed thematically, in order to deepen our understanding of their experiences. Thematic analysis resulted in two scenarios, routine and stress and an analysis of accompanying team processes. Routine refers to a setting perceived as straightforward. Stress develops in the presence of a combination of stressors such as a lack of clarity in roles and a lack of knowledge on fellow team members. Participants reported that stress affects the team, specifically through an altering of communication, a decrease in situational awareness, and formation of subgroups. This may lead to a further increase in stress, and potentially result in a vicious cycle. Team processes in a stressful situation like CPR can be disrupted by different stressors, and might affect the team and their performance. Improved knowledge about the stressors and their effects might be used to design a training environment representative for the performance setting healthcare professionals work in. Further research on the impact of representative training with team-level stressors and the development of a "team brain" might be worthwhile.

7. Circulation. 2023 Dec 18. doi: 10.1161/CIR.0000000000001194. Online ahead of print.
2023 American Heart Association Focused Update on Adult Advanced Cardiovascular Life Support: An Update to the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.
Perman SM, Elmer J, Maciel CB, Uzendu A, May T, Mumma BE, Bartos JA, Rodriguez AJ, Kurz MC, Panchal AR, Rittenberger JC; American Heart Association.
ABSTRACT
Cardiac arrest is common and deadly, affecting up to 700 000 people in the United States annually. Advanced cardiac life support measures are commonly used to improve outcomes. This "2023 American Heart Association Focused Update on Adult Advanced Cardiovascular Life Support" summarizes the most recent published evidence for and recommendations on the use of medications, temperature management, percutaneous coronary angiography, extracorporeal cardiopulmonary resuscitation, and seizure management in this population. We discuss the lack of data in recent cardiac arrest literature that limits our ability to evaluate diversity, equity, and inclusion in this population. Last, we consider how the cardiac arrest population may make up an important pool of organ donors for those awaiting organ transplantation.

8. Resuscitation. 2023 Dec;193:109995. doi: 10.1016/j.resuscitation.2023.109995. Epub 2023 Oct 7.
Improving EMS response times for out-of-hospital cardiac arrest in urban areas using drone-like vertical take-off and landing air ambulances: An international, simulation-based cohort study.
Heidet M(1), Benjamin Leung KH(2), Bougouin W(3), Alam R(2), Frattini B(4), Liang D(5), Jost D(6), Canon V(7), Deakin J(8), Hubert H(7), Christenson J(9), Vivien B(10), Chan T(2), Cariou A(11), Dumas F(12), Jouven X(13), Marijon E(13), Bennington S(14), Travers S(4), Souihi S(15), Mermet E(16), Freyssenge J(17), Arrouy L(18), Lecarpentier E(14), Derkenne C(19), Grunau B(9).
ABSTRACT
BACKGROUND: Advances in vertical take-off and landing (VTOL) technologies may enable drone-like crewed air ambulances to rapidly respond to out-of-hospital cardiac arrest (OHCA) in urban areas. We estimated the impact of incorporating VTOL air ambulances on OHCA response intervals in two large urban centres in France and Canada. METHODS: We included adult OHCAs occurring between Jan. 2017-Dec. 2018 within Greater Paris in France and Metro Vancouver in Canada. Both regions utilize tiered OHCA response with basic (BLS)- and advanced life support (ALS)-capable units. We simulated incorporating 1-2 ALS-capable VTOL air ambulances dedicated to OHCA response in each

study region, and computed time intervals from call reception by emergency medical services (EMS) to arrival of the: (1) first ALS unit ("call-to-ALS arrival interval"); and (2) first EMS unit ("call-to-first EMS arrival interval"). RESULTS: There were 6,217 OHCAs included during the study period (3,760 in Greater Paris and 2,457 in Metro Vancouver). Historical median call-to-ALS arrival intervals were 21 min [IQR 16-29] in Greater Paris and 12 min [IQR 9-17] in Metro Vancouver, while median call-to-first EMS arrival intervals were 11 min [IQR 8-14] and 7 min [IQR 5-8] respectively. Incorporating 1-2 VTOL air ambulances improved median call-to-ALS arrival intervals to 7-9 min and call-to-first EMS arrival intervals to 6-8 min in both study regions (all $P < 0.001$). CONCLUSION: VTOL air ambulances dedicated to OHCA response may improve EMS response intervals, with substantial improvements in ALS response metrics.

9. Int J Nurs Stud Adv. 2023 Dec;5:100134. doi: 10.1016/j.ijnsa.2023.100134. Epub 2023 May 18.
The associations between rapid response systems and their components with patient outcomes: A scoping review.
Piasecki RJ(1), Himmelfarb CRD(1), Gleason KT(1), Justice RM(2), Hunt EA(1).
ABSTRACT
BACKGROUND: While rapid response systems have been widely implemented, their impact on patient outcomes remains unclear. Further understanding of their components-including medical emergency team triggers, medical emergency team member composition, additional roles in patient care beyond responding to medical emergency team events, and their involvement in "Do-Not-Resuscitate" order placement-may elucidate the relationship between rapid response systems and outcomes. OBJECTIVE: To explore how recent studies have examined rapid response system components in the context of relevant adverse patient outcomes, such as in-hospital cardiac arrests and hospital mortality. DESIGN: Scoping review. METHODS: PubMed, CINAHL, and Embase were searched for articles published between November 2014 and June 2022. Studies mainly focused on rapid response systems and associations with in-hospital cardiac arrests were considered. The following were extracted for analysis: study design, location, sample size, participant characteristics, system characteristics (including medical emergency team member composition, additional system roles outside of medical emergency team events), medical emergency team triggers, in-hospital cardiac arrests, and hospital mortality. RESULTS: Thirty-four studies met inclusion criteria. While most studies described triggers used, few analyzed medical emergency team trigger associations with outcomes. Of those, medical emergency team triggers relating to respiratory abnormalities and use of multiple triggers to activate the medical emergency team were associated with adverse patient outcomes. Many studies described medical emergency team member composition, but the way composition was reported varied across studies. Of the seven studies with dedicated medical emergency team members, six found their systems were associated with decreased incidence of in-hospital cardiac arrests. Six of seven studies that described additional medical emergency team roles in educating staff in rapid response system use found their systems were associated with significant decreases in adverse patient outcomes. Four of five studies that described proactive rounding responsibilities reported found their systems were associated with significant decreases in adverse patient outcomes. Reporting of rapid response system involvement in "Do-Not-Resuscitate" order placement was variable across studies. CONCLUSIONS: Inconsistencies in describing rapid response system components and related data and outcomes highlights how these systems are complex to a degree not fully captured in existing literature. Further large-scale examination of these components across institutions is warranted. Development and use of robust and standardized metrics to track data related to rapid response system components and related outcomes are needed to optimize these systems and improve patient outcomes.

10. Resuscitation. 2023 Dec 18;194:110093. doi: 10.1016/j.resuscitation.2023.110093. Online ahead of print.

Prioritizing intervention preferences to potentially reduce caregiver burden in racially and ethnically diverse close family members of cardiac arrest survivors.

Agarwal S(1), Tincher IM(2), Abukhadra SL(3), Rojas DA(2), DeForge CE(4), Marchionda C(5), Wylie J(6), Chap J(7).

ABSTRACT

AIM: Close family members of cardiac arrest patients who survive to hospital discharge have elevated levels of psychological distress and caregiver burden. We assessed their preferences toward needs during hospitalization and beyond to inform intervention development. METHODS: Through an online survey developed by a multidisciplinary team of researchers, clinicians, cardiac arrest survivors, and families, adult close family members recruited through advocacy organizations ranked top choice among 8 unique interventions addressing either information-based needs (n = 4) or well-being needs (n = 4). Logistic Regression analysis was conducted to assess the associations of family members' attributes, caregiving characteristics, and survivors' hospitalization factors with two intervention groups. RESULTS: Of 657 responses received, ranking data of 550 close family members (59% between 18-40 years of age, 65% female, 51% of minority race/ethnicity, 53% partners, provided a median of 8 hours of caregiving, for a median of 4.5 months) were analyzed. Information needs were the more commonly preferred intervention group (63%; n = 347), with education on the potential recovery of survivors ranking first (28%; n = 149). In a multivariate model, family members age >40 years, families witnessing the cardiac arrest, assuming the caregiver role either during hospitalization or within one month of hospital discharge, and discharging directly to home were significantly associated with prioritizing information needs over well-being needs, after adjusting for sex, race, intensity, and duration of caregiving. CONCLUSIONS: Interventions focusing on information needs are among the top priorities for families of cardiac arrest survivors. Prospective studies testing these hypotheses-generating findings are needed to inform further intervention development.

11. Resuscitation. 2023 Dec 15:110090. doi: 10.1016/j.resuscitation.2023.110090. Online ahead of print.

Cardiac arrest centre accreditation in Germany: A game-changer for favourable neurological outcomes after cardiac arrest.

Goto Y(1).

NO ABSTRACT AVAILABLE

12. Scand J Trauma Resusc Emerg Med. 2023 Dec 21;31(1):107. doi: 10.1186/s13049-023-01171-0.

A classification system for identifying patients dead on ambulance arrival: a prehospital medical record review.

Petersen M(#)(1), Kjeldtoft FG(#)(1), Christensen EF(1)(2), Bøggild H(3)(4), Lindskou TA(5).

ABSTRACT

BACKGROUND: Patients dead before arrival of the ambulance or before arrival at hospital may be in- or excluded in mortality analyses, making comparison of mortality difficult. Often only physicians are allowed to declare death, thereby impeding uniform registration of prehospital death. Many studies do not report detailed definitions of prehospital mortality. Our aim was to define criteria to identify and categorize prehospital patients' vital status, and to estimate the proportion of these groups, primarily the proportion of patients dead on ambulance arrival. METHODS: Prehospital medical records review for patients receiving an ambulance in the North Denmark Region from 2019 to 2021 and registered dead on the same or the following day. We defined three vital status categories: (1)

Dead on Ambulance Arrival (DOAA), (2) Out-of-Hospital Cardiac Arrest (OHCA) divided into OHCA Basic Life Support (OHCA BLS) and OHCA Advanced treatment, and 3) Alive on Ambulance Arrival. RESULTS: Among 3 174 dead patients, DOAA constituted 28.8%, OHCA BLS 13.4%, OHCA Advanced treatment 31.3%, and Alive on Ambulance Arrival 26.6%. CONCLUSION: We defined exhaustive and mutually exclusive criteria to define vital status, DOAA, OHCA, and Alive on Ambulance Arrival based on prehospital medical records. More than one out of four patients receiving an ambulance and registered dead on the same or the following day were dead already at ambulance arrival. Adding OHCA BLS where resuscitation was terminated without defibrillation or other treatment, increased the proportion of patients dead on ambulance arrival to 42%. We recommend reporting similar categories of vital status to improve valid comparisons of prehospital mortality rates.

13. Resusc Plus. 2023 Dec 20;17:100531. doi: 10.1016/j.resplu.2023.100531. eCollection 2024 Mar.
Basic life support for non-traumatic out-of-hospital cardiac arrests during school-supervised sports activities in children: A nationwide observational study in Japan.
Kiyohara K(1), Matsui S(2), Ayusawa M(3), Sudo T(4), Nitta M(5)(6)(7), Iwami T(8), Nakata K(9), Kitamura Y(2), Sobue T(2), Kitamura T(2); SPIRITS investigators.
ABSTRACT
OBJECTIVE: To investigate the prognostic impact of bystander-initiated cardiopulmonary resuscitation (CPR) and public-access automated external defibrillator (AED) use on non-traumatic out-of-hospital cardiac arrest (OHCA) occurring during school-supervised sports activities in children. METHODS: From a nationwide database of pediatric OHCAs occurring under school supervision in Japan, data between April 2008 and December 2020 were obtained. We analyzed non-traumatic OHCAs that occurred during school-supervised sports activities among schoolchildren from elementary, junior high, high, and technical colleges. A multivariable logistic regression model was used to evaluate the effect of basic life support (BLS) on 1-month survival with favorable neurological outcomes after OHCA. RESULTS: In total, 318 OHCA cases were analyzed. The 1-month survival with favorable neurological outcomes was 64.8% (164/253) in cases receiving both bystander-CPR and AED application, 40.7% (11/27) in cases receiving CPR only, 38.5% (5/13) in patients receiving AED application only, and 28.0% (7/25) in cases receiving no bystander intervention. Compared with cases receiving no BLS, cases receiving both CPR and AED had a significantly higher proportion of 1-month survival with favorable neurological outcomes (adjusted odds ratio [AOR]: 3.97, 95% confidence interval [CI]: 1.32-11.90, p = 0.014). However, compared to cases receiving no BLS, there was no significant difference in the outcome in the cases receiving CPR only (AOR: 1.35, 95% CI: 0.34-5.29, p = 0.671) and the cases receiving AED application only (AOR: 1.26, 95% CI: 0.25-6.38, p = 0.778). CONCLUSION: The combination of CPR and AED as BLS performed by bystanders for non-traumatic OHCA during school-supervised sports activities improved the outcomes.

14. Circ Cardiovasc Qual Outcomes. 2023 Dec 26:e010116. doi: 10.1161/CIRCOUTCOMES.123.010116. Online ahead of print.
Association Between Delays in Time to Bystander CPR and Survival for Witnessed Cardiac Arrest in the United States.
Nguyen DD(1)(2), Spertus JA(1)(2), Kennedy KF(1), Gupta K(2), Uzendu AI(1)(2), McNally BF(3), Chan PS(1)(2).
ABSTRACT
BACKGROUND: Prompt initiation of bystander cardiopulmonary resuscitation (CPR) is critical to survival for out-of-hospital cardiac arrest (OHCA). However, the association between delays in bystander CPR and OHCA survival is poorly understood. METHODS: In this observational study using

a nationally representative US registry, we identified patients who received bystander CPR from a layperson for a witnessed OHCA from 2013 to 2021. Hierarchical logistic regression was used to estimate the association between time to CPR (<1 minute versus 2-3, 4-5, 6-7, 8-9, and ≥10-minute intervals) and survival to hospital discharge and favorable neurological survival (survival to discharge with cerebral performance category of 1 or 2 [ie, without severe neurological disability]). RESULTS: Of 78 048 patients with a witnessed OHCA treated with bystander CPR, the mean age was 63.5±15.7 years and 25, 197 (32.3%) were women. The median time to bystander CPR was 2 (1-5) minutes, with 10% of patients having a≥10-minute delay before initiation of CPR. Overall, 15 000 (19.2%) patients survived to hospital discharge and 13 159 (16.9%) had favorable neurological survival. There was a graded inverse relationship between time to bystander CPR and survival to hospital discharge (P for trend <0.001). Compared with patients who received CPR within 1 minute, those with a time to CPR of 2 to 3 minutes were 9% less likely to survive to discharge (adjusted odds ratio, 0.91 [95% CI, 0.87-0.95]) and those with a time to CPR 4 to 5 minutes were 27% less likely to survive (adjusted odds ratio, 0.73 [95% CI, 0.68-0.77]). A similar graded inverse relationship was found between time to bystander CPR and favorable neurological survival (P for trend <0.001). CONCLUSIONS: Among patients with witnessed OHCA, there was a dose-response relationship between delays in bystander initiation of CPR and lower survival rates.

15. J Telemed Telecare. 2024 Jan;30(1):98-106. doi: 10.1177/1357633X211028490. Epub 2021 Jun 25.

Video-assisted cardiopulmonary resuscitation: Does the camera perspective matter? A randomized, controlled simulation trial.

Wetsch WA(1)(2), Ecker HM(1)(2), Scheu A(1)(2), Roth R(1)(3), Böttiger BW(1)(2), Plata C(1)(2)(4).

ABSTRACT

BACKGROUND: Dispatcher assistance can help to save lives during layperson cardiopulmonary resuscitation during cardiac arrest. The aim of this study was to investigate the influence of different camera positions on the evaluation of cardiopulmonary resuscitation performance during video-assisted cardiopulmonary resuscitation. METHODS: For this randomized, controlled simulation trial, seven video sequences of cardiopulmonary resuscitation performance were recorded from three different camera positions: side, foot and head position. Video sequences showed either correct cardiopulmonary resuscitation performance or one of the six typical errors: low and high compression rate, superficial and increased compression depth, wrong hand position or incomplete release. Video sequences with different cardiopulmonary resuscitation performances and camera positions were randomly combined such that each evaluator was presented seven individual combinations of cardiopulmonary resuscitation and camera position and evaluated each Cardio-pulmonary resuscitation performance once. A total of 46 paramedics and 47 emergency physicians evaluated seven video sequences of cardiopulmonary resuscitation performance from different camera positions. The primary hypothesis was that there are differences in accuracy of correct assessment/error recognition depending on camera perspective. Generalized linear multi-level analyses assuming a binomial distribution and a logit link were employed to account for the dependency between each evaluator's seven ratings. RESULTS: Of 651 video sequences, cardiopulmonary resuscitation performance was evaluable in 96.8% and correctly evaluated in 74.5% over all camera positions. Cardiopulmonary resuscitation performance was classified correctly from a side perspective in 81.3%, from a foot perspective in 68.8% and from a head perspective in 73.6%, revealing a significant difference in error recognition depending on the camera perspective ($p = .01$). Correct cardiopulmonary resuscitation was mistakenly evaluated to be false in 46.2% over all perspectives. CONCLUSIONS: Participants were able to recognize significantly more mistakes when the camera was located on the opposite side of the cardiopulmonary resuscitation provider.

Foot position should be avoided in order to enable the dispatcher the best possible view to evaluating cardiopulmonary resuscitation quality.

POST-CARDIAC ARREST TREATMENTS

1. J Clin Med. 2023 Dec 13;12(24):7655. doi: 10.3390/jcm12247655.
Predictive Performance of Neuron-Specific Enolase (NSE) for Survival after Resuscitation from Cardiac Arrest: A Systematic Review and Meta-Analysis.
Kurek K(1), Swieczkowski D(2), Pruc M(3)(4), Tomaszewska M(1), Cubala WJ(5), Szarpak L(6)(7)(8).
ABSTRACT
The prediction of outcomes following cardiac arrest continues to provide significant difficulties. A preferred strategy involves adopting a multimodal approach, which encompasses the careful evaluation of the biomarker neuron-specific enolase (NSE). This systematic review and meta-analysis aimed to gather and summarize new and existing evidence on the prediction effect of neuron-specific enolase for survival to hospital discharge among adult patients with cardiac arrest. We searched PubMed Central, Scopus, EMBASE databases, and the Cochrane Library without language restrictions from their inceptions until 30 October 2023 and checked the reference lists of the included studies. Pooled results were reported as standardized mean differences (SMDs) and were presented with corresponding 95% confidence intervals (CIs). The primary outcome was survival to hospital discharge (SHD). Eighty-six articles with 10,845 participants were included. NSE showed a notable degree of specificity in its ability to predict mortality as well as neurological status among individuals who experienced cardiac arrest ($p < 0.05$). This study demonstrates the ability to predict fatality rates and neurological outcomes, both during the time of admission and at various time intervals after cardiac arrest. The use of NSE in a multimodal neuroprognostication algorithm has promise in improving the accuracy of prognoses for persons who have undergone cardiac arrest.

2. Circulation. 2023 Dec 19. doi: 10.1161/CIR.0000000000001199. Online ahead of print.
Cardiac Catheterization Laboratory Management of the Comatose Adult Patient With an Out-of-Hospital Cardiac Arrest: A Scientific Statement From the American Heart Association.
Tamis-Holland JE, Menon V, Johnson NJ, Kern KB, Lemor A, Mason PJ, Rodgers M, Serrao GW, Yannopoulos D; Interventional Cardiovascular Care Committee and the Acute Cardiac Care andGeneral Cardiology Committee of the Council on Clinical Cardiology; Council on Arteriosclerosis, Thrombosis and Vascular Biology; and Council on Cardiovascular and Stroke Nursing.
ABSTRACT
Out-of-hospital cardiac arrest is a leading cause of death, accounting for ≈50% of all cardiovascular deaths. The prognosis of such individuals is poor, with <10% surviving to hospital discharge. Survival with a favorable neurologic outcome is highest among individuals who present with a witnessed shockable rhythm, received bystander cardiopulmonary resuscitation, achieve return of spontaneous circulation within 15 minutes of arrest, and have evidence of ST-segment elevation on initial ECG after return of spontaneous circulation. The cardiac catheterization laboratory plays an important role in the coordinated Chain of Survival for patients with out-of-hospital cardiac arrest. The catheterization laboratory can be used to provide diagnostic, therapeutic, and resuscitative support after sudden cardiac arrest from many different cardiac causes, but it has a unique importance in the treatment of cardiac arrest resulting from underlying coronary artery disease. Over the past few years, numerous trials have clarified the role of the cardiac catheterization laboratory in the management of resuscitated patients or those with ongoing cardiac arrest. This scientific statement provides an update on the contemporary approach to managing resuscitated patients or those with ongoing cardiac arrest.

3. Coron Artery Dis. 2024 Jan 1;35(1):67-75. doi: 10.1097/MCA.0000000000001298. Epub 2023 Oct 11.

Coronary angiography after out-of-hospital cardiac arrest without ST-segment elevation: a systematic review and meta-analysis of randomised trials.

Ferraz Costa G(1)(2)(3), Santos I(4), Sousa J(4), Beirão S(4), Teixeira R(1)(2)(3).

ABSTRACT

BACKGROUND: Out-of-hospital cardiac arrest (OHCA) has a poor prognosis. The optimal timing and role of early coronary angiography (CAG) in OHCA patients without ST-segment elevation remains unclear. The goal of this study is to compare an early CAG versus delayed CAG strategy in OHCA patients without ST elevation. METHODS: We systematically searched PubMed, Embase and Cochrane databases, in June 2022, for randomised controlled trials (RCTs) comparing early versus delayed early CAG. A random effects meta-analysis was performed. RESULTS: A total of seven RCTs were included, providing a total of 1625 patients: 816 in an early strategy and 807 in a delayed strategy. In terms of outcomes assessed, our meta-analysis revealed a similar rate of all-cause mortality (pooled odds ratio [OR] 1.22 [0.99-1.50], P = 0.06, I 2 = 0%), neurological status (pooled OR 0.94 [0.74-1.21], = 0.65, I 2 = 0%), need of renal replacement therapy (pooled OR 1.11 [0.78-1.74], P = 0.47, I 2 = 0%) and major bleeding events (pooled OR 1.51 [0.95-2.40], P = 0.08, I 2 = 69%). CONCLUSION: According to our meta-analysis, in patients who experienced OHCA without ST elevation, early CAG is not associated with reduced mortality or an improved neurological status.

4. Sci Rep. 2023 Dec 11;13(1):21880. doi: 10.1038/s41598-023-49345-1.

Combination strategy for prognostication in patients undergoing post-resuscitation care after cardiac arrest.

Park JS(#)(1)(2), Kim EY(#)(3), You Y(1)(2), Min JH(2), Jeong W(1)(2), Ahn HJ(1)(2), In YN(2), Lee IH(4)(5), Kim JM(6), Kang C(7)(8).

ABSTRACT

This study investigated the prognostic performance of combination strategies using a multimodal approach in patients treated after cardiac arrest. Prospectively collected registry data were used for this retrospective analysis. Poor outcome was defined as a cerebral performance category of 3-5 at 6 months. Predictors of poor outcome were absence of ocular reflexes (PR/CR) without confounding factors, a highly malignant pattern on the most recent electroencephalography, defined as suppressed background with or without periodic discharges and burst-suppression, high neuron-specific enolase (NSE) after 48 h, and diffuse injury on imaging studies (computed tomography or diffusion-weighted imaging [DWI]) at 72-96 h. The prognostic performances for poor outcomes were analyzed for sensitivity and specificity. A total of 130 patients were included in the analysis. Of these, 68 (52.3%) patients had poor outcomes. The best prognostic performance was observed with the combination of absent PR/CR, high NSE, and diffuse injury on DWI [91.2%, 95% confidence interval (CI) 80.7-97.1], whereas the combination strategy of all available predictors did not improve prognostic performance (87.8%, 95% CI 73.8-95.9). Combining three of the predictors may improve prognostic performance and be more efficient than adding all tests indiscriminately, given limited medical resources.

5. J Am Heart Assoc. 2023 Dec 29:e031716. doi: 10.1161/JAHA.123.031716. Online ahead of print.

Incidence and Long-Term Outcomes of Acute Myocardial Infarction Among Survivors of Out-of-Hospital Cardiac Arrest.

Ho AFW(1)(2), Zheng H(3), Ng ZHC(4), Pek PP(1), Ng BJH(4), Chin YH(4), Lam TJR(4), Østbye T(5), Tromp J(6)(7), Ong MEH(1)(2), Yeo JW(4); Singapore PAROS Investigators †.

ABSTRACT

BACKGROUND: Despite the increasing long-term survival after out-of-hospital cardiac arrest (OHCA), the risk of subsequent acute myocardial infarction (AMI) remains poorly understood. We aimed to determine the incidence, predictors, and long-term outcomes of AMI among survivors of OHCA. METHODS AND RESULTS: We assembled a retrospective cohort of 882 patients with OHCA who survived to 30 days or discharge from the hospital between 2010 and 2019. Survivors of OHCA had

an increased risk of subsequent AMI, defined as AMI occurring 30 days after index OHCA or following discharge from the hospital after OHCA, compared with the general population when matched for age and sex (standardized incidence ratio, 4.64 [95% CI, 3.52-6.01]). Age-specific risks of subsequent AMI for men (standardized incidence ratio, 3.29 [95% CI, 2.39-4.42]) and women (standardized incidence ratio, 6.15 [95% CI, 3.27-10.52]) were significantly increased. A total of 7.2%, 8.3%, and 14.3% of survivors of OHCA had a subsequent AMI at 3 years, 5 years, and end of follow up, respectively. Age at OHCA (hazard ratio [HR], 1.04 [95% CI, 1.02-1.06]) and past medical history of prior AMI, defined as any AMI preceding or during the index OHCA event (HR, 1.84 [95% CI, 1.05-3.22]), were associated with subsequent AMI, while an initial shockable rhythm was not (HR, 1.00 [95% CI, 0.52-1.94]). Survivors of OHCA with subsequent AMI had a higher risk of death (HR, 1.58 [95% CI, 1.12-2.22]) than those without. CONCLUSIONS: Survivors of OHCA are at an increased risk of subsequent AMI compared with the general population. Prior AMI, but not an initial shockable rhythm, increases this risk, while subsequent AMI predicts death. Preventive measures for AMI including cardiovascular risk factor control and revascularization may thus improve outcomes in selected patients with cardiac pathogenesis.

TARGETED TEMPERATURE MANAGEMENT

1. JAMA Neurol. 2023 Dec 18:e234820. doi: 10.1001/jamaneurol.2023.4820. Online ahead of print.
Hypothermia vs Normothermia in Patients With Cardiac Arrest and Nonshockable Rhythm: A Meta-Analysis.
Taccone FS(1)(2), Dankiewicz J(3), Cariou A(2)(4), Lilja G(5)(6), Asfar P(7), Belohlavek J(8), Boulain T(9), Colin G(10), Cronberg T(5)(6), Frat JP(11), Friberg H(12)(13), Grejs AM(14)(15), Grillet G(16), Girardie P(17), Haenggi M(18), Hovdenes J(19), Jakobsen JC(20)(21), Levin H(22), Merdji H(23)(24), Njimi H(1), Pelosi P(25), Rylander C(26), Saxena M(27)(28), Thomas M(29), Young PJ(30)(31)(32)(33), Wise MP(34), Nielsen N(11), Lascarrou JB(2)(35)(36).
ABSTRACT
IMPORTANCE: International guidelines recommend body temperature control below 37.8 °C in unconscious patients with out-of-hospital cardiac arrest (OHCA); however, a target temperature of 33 °C might lead to better outcomes when the initial rhythm is nonshockable. OBJECTIVE: To assess whether hypothermia at 33 °C increases survival and improves function when compared with controlled normothermia in unconscious adults resuscitated from OHCA with initial nonshockable rhythm. DATA SOURCES: Individual patient data meta-analysis of 2 multicenter, randomized clinical trials (Targeted Normothermia after Out-of-Hospital Cardiac Arrest [TTM2; NCT02908308] and HYPERION [NCT01994772]) with blinded outcome assessors. Unconscious patients with OHCA and an initial nonshockable rhythm were eligible for the final analysis. STUDY SELECTION: The study cohorts had similar inclusion and exclusion criteria. Patients were randomized to hypothermia (target temperature 33 °C) or normothermia (target temperature 36.5 to 37.7 °C), according to different study protocols, for at least 24 hours. Additional analyses of mortality and unfavorable functional outcome were performed according to age, sex, initial rhythm, presence or absence of shock on admission, time to return of spontaneous circulation, lactate levels on admission, and the cardiac arrest hospital prognosis score. DATA EXTRACTION AND SYNTHESIS: Only patients who experienced OHCA and had a nonshockable rhythm with all causes of cardiac arrest were included. Variables from the 2 studies were available from the original data sets and pooled into a unique database and analyzed. Clinical outcomes were harmonized into a single file, which was checked for accuracy of numbers, distributions, and categories. The last day of follow-up from arrest was recorded for each patient. Adjustment for primary outcome and functional outcome was performed using age, gender, time to return of spontaneous circulation, and bystander cardiopulmonary resuscitation. MAIN OUTCOMES AND MEASURES: The primary outcome was mortality at 3 months;

secondary outcomes included unfavorable functional outcome at 3 to 6 months, defined as a Cerebral Performance Category score of 3 to 5. RESULTS: A total of 912 patients were included, 490 from the TTM2 trial and 422 from the HYPERION trial. Of those, 442 had been assigned to hypothermia (48.4%; mean age, 65.5 years; 287 males [64.9%]) and 470 to normothermia (51.6%; mean age, 65.6 years; 327 males [69.6%]); 571 patients had a first monitored rhythm of asystole (62.6%) and 503 a presumed noncardiac cause of arrest (55.2%). At 3 months, 354 of 442 patients in the hypothermia group (80.1%) and 386 of 470 patients in the normothermia group (82.1%) had died (relative risk [RR] with hypothermia, 1.04; 95% CI, 0.89-1.20; P = .63). On the last day of follow up, 386 of 429 in the hypothermia group (90.0%) and 413 of 463 in the normothermia group (89.2%) had an unfavorable functional outcome (RR with hypothermia, 0.99; 95% CI, 0.87-1.15; P = .97). The association of hypothermia with death and functional outcome was consistent across the prespecified subgroups. CONCLUSIONS AND RELEVANCE: In this individual patient data meta-analysis, including unconscious survivors from OHCA with an initial nonshockable rhythm, hypothermia at 33 °C did not significantly improve survival or functional outcome.

2. Resuscitation. 2023 Dec;193:110018. doi: 10.1016/j.resuscitation.2023.110018. Epub 2023 Oct 27.
Effect of adjuvant thiamine and ascorbic acid administration on the neurologic outcomes of out-of-hospital cardiac arrest patients: A before-and-after study.
Kim YJ(1), Lee YJ(2), Kim YH(3), Kim WY(4).
ABSTRACT
AIM: This study aimed to evaluate the impact of early thiamine and ascorbic acid administration on the neurologic outcome in out-of-hospital cardiac arrest (OHCA) patients treated with targeted temperature management (TTM). METHODS: This before-and-after cohort study used data extracted from two hospitals of the Korean Hypothermia Network prospective registry. The treatment group incorporated patients enrolled from December 2019 to May 2021, that received intravenous thiamine (200 mg) and ascorbic acid (3 g) at 12-hour intervals for a total of six doses. The control group incorporated those enrolled from May 2018 to November 2019. The one-month good neurologic outcome, defined as a Cerebral Performance Category score ≤ 2, between the groups was evaluated using inverse probability of treatment weighting (IPTW). RESULTS: Among the 234 OHCA survivors with TTM, 102 were included in the treatment group and 132 were included in the control group. The one-month (31.4 % vs. 29.5 %, respectively; P = 0.76) good neurologic outcome rates did not differ between the treatment and control groups. After adjusting using the IPTW, vitamin supplementation was not associated with good neurologic outcome (odds ratio [OR], 1.134; 95 % confidence interval [CI], 0.644-1.999; P = 0.66). In subgroup analysis, vitamin administration was significantly associated with a good neurologic outcome in older (≥65 years) patients (adjusted OR, 5.53; 95 % CI, 1.21-25.23; P = 0.03). CONCLUSION: Adjuvant thiamine and ascorbic acid administration in OHCA survivors with TTM did not improve their neurologic outcome after one month. Further clinical trials are warranted.

3. Eur J Anaesthesiol. 2023 Dec 20. doi: 10.1097/EJA.0000000000001948. Online ahead of print.
Temperature control after successful resuscitation from cardiac arrest in adults: A joint statement from the European Society for Emergency Medicine and the European Society of Anaesthesiology and Intensive Care.
Behringer W(1), Böttiger BW, Biasucci DG, Chalkias A, Connolly J, Dodt C, Khoury A, Laribi S, Leach R, Ristagno G.
NO ABSTRACT AVAILABLE

4. Eur J Emerg Med. 2023 Dec 21. doi: 10.1097/MEJ.0000000000001106. Online ahead of print.

Temperature control after successful resuscitation from cardiac arrest in adults: a joint statement from the European Society for Emergency Medicine (EUSEM) and the European Society of Anaesthesiology and Intensive Care (ESAIC).
Behringer W(1), Böttiger BW(2), Biasucci DG(3), Chalkias A(4)(5), Connolly J(6), Dodt C(7), Khoury A(8), Laribi S(9), Leach R(10), Ristagno G(11).
NO ABSTRACT AVAILABLE

5. Open Heart. 2023 Dec 14;10(2):e002459. doi: 10.1136/openhrt-2023-002459.
Factors influencing deviation from target temperature during targeted temperature management in postcardiac arrest patients.
Ochiai K(1)(2), Otomo Y(3)(4).
ABSTRACT
BACKGROUND: Targeted temperature management (TTM) is a recommended therapy for postcardiac arrest patients. Hyperthermia worsened the patient outcome, and overcooling increased the incidence of complications; therefore, a high-quality TTM is required. The target temperature tended to be modified worldwide after the TTM trial in 2013. Our institute modified the target temperature to 35°C in 2017. This study aimed to compare the conventional and modified protocols, assess the relationship between target temperature deviation and patient outcomes, and identify the factors influencing temperature deviation. METHODS: This single-centre, retrospective, observational study included adult out-of-hospital cardiac arrest patients who underwent TTM between April 2013 and October 2019. We compared the conventional and modified protocol groups to evaluate the difference in the background characteristics and details on TTM. Subsequently, we assessed the relationship of deviation (>±0.5°C, >37°C, or<33°C) rates from the target temperature with mortality and neurological outcomes. We assessed the factors that influenced the deviation from the target temperature. RESULTS: Temperature deviation was frequently observed in the conventional protocol group (p=0.012), and the modified protocol group required higher doses of neuromuscular blocking agents (NMBAs) during TTM (p=0.016). Other background data, completion of protocol, incidence of complications, mortality and rate of favourable neurological outcomes were not significantly different. The performance rate of TTM was significantly higher in the modified group than in the conventional protocol group (p<0.001). Temperature deviation did not have an impact on the outcomes. Age, sex, body surface area, NMBA doses and type of cooling device were the factors influencing temperature deviation. CONCLUSIONS: A target temperature of 35°C might be acceptable and easily attainable if shivering of the patients was well controlled using NMBAs. Temperature deviation did not have an impact on outcomes. The identified factors influencing deviation from target temperature might be useful for ensuring a high-quality TTM.

6. JAMA Neurol. 2023 Dec 18. doi: 10.1001/jamaneurol.2023.4831. Online ahead of print.
Hypothermia to 33 °C Following Cardiac Arrest: Time to Close the Freezer Door for Good?
Spears WE(1), Greer DM(1).
NO ABSTRACT AVAILABLE

7. Am J Emerg Med. 2024 Jan;75:46-52. doi: 10.1016/j.ajem.2023.10.028. Epub 2023 Oct 20.
Prediction of the neurological outcomes post-cardiac arrest: A prospective validation of the CAST and rCAST.
Kikutani K(1), Nishikimi M(2), Matsui K(3), Sakurai A(4), Hayashida K(5), Kitamura N(6), Tagami T(7), Nakada TA(8), Matsui S(3), Ohshimo S(1), Shime N(1); SOS-KANTO 2017 Study Group.
ABSTRACT

INTRODUCTION: The neurologic prognosis of out-of-hospital cardiac arrest (OHCA) patients in whom return of spontaneous circulation (ROSC) is achieved remains poor. The aim of this study was to externally and prospectively validate two scoring systems developed by us: the CAST score, a scoring system to predict the neurological prognosis of OHCA patients undergoing targeted temperature management (TTM), and a simplified version of the same score developed for improved ease of use in clinical settings, the revised CAST (rCAST) score. METHODS: This study was a prospective, multicenter, observational study conducted using the SOS KANTO 2017 registry, an OHCA registry involving hospitals in the Kanto region (including Tokyo) of Japan. The primary outcome was favorable neurological outcome (defined as Cerebral Performance Category score of 1 or 2) at 30 days and the secondary outcomes were favorable neurological outcome at 90 days and survival at 30 and 90 days. The predictive accuracies of the original CAST (oCAST) and rCAST scores were evaluated by using area under the receiver operating characteristic curve (AUC). RESULTS: Of 9909 OHCA patients, 565 showed ROSC and received TTM. Of these, we analyzed the data of 259 patients in this study. The areas under the receiver operating characteristic curve (AUCs) of the oCAST and rCAST scores for predicting a favorable neurological outcome at 30 days were 0.86 and 0.87, respectively, and those for predicting a favorable neurological outcome at 90 days were 0.87 and 0.88, respectively. The rCAST showed a higher predictive accuracy for the neurological outcome as compared with the NULL-PLEASE score. The patients with a favorable neurological outcome who had been classified into the high severity group based on the rCAST tended to have hypothermia at hospital arrival and to not show any signs of loss of gray-white matter differentiation on brain CT. Neurological function at 90 days was correlated with the rCAST ($r = 0.63$, $p < 0.001$). CONCLUSIONS: rCAST showed high predictive accuracy for the neurological prognosis of OHCA patients managed by TTM, comparable to that of the oCAST score. The scores on the rCAST were strongly correlated with the neurological functions at 90 days, implying that the rCAST is a useful scale for assessing the severity of brain injury after cardiac arrest.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

No articles identified.

PEDIATRICS AND CHILDREN

1. Am J Emerg Med. 2023 Dec 9;77:81-86. doi: 10.1016/j.ajem.2023.12.002. Online ahead of print.
A novel CPR-assist device vs. established chest compression techniques in infant CPR: A manikin study.
Kao CL(1), Tsou JY(2), Hong MY(1), Chang CJ(1), Tu YF(3), Huang SP(1), Su FC(4), Chi CH(5).
ABSTRACT
INTRODUCTION: Guidelines for infant CPR recommend the two-thumb encircling hands technique (TTT) and the two-finger technique (TFT) for chest compression. Some devices have been designed to assist with infant CPR, but are often not readily available. Syringe plungers may serve as an alternative infant CPR assist device given their availability in most hospitals. In this study, we aimed to determine whether CPR using a syringe plunger could improve CPR quality measurements on the Resusci-Baby manikin compared with traditional methods of infant CPR. METHODS: Compression area with a diameter of 1 to 2 cm is recommended in previous infant CPR device researches. In this is a randomized crossover manikin study, we examined the efficacy of the Syringe Plunger Technique (SPT) which uses the plunger of the 20 ml syringe with a 2 cm diameter flat piston, commonly

available in hospital, for infant External Chest Compressions (ECC). Participants performed TTT, TFT and SPT ECC on Resusci® Baby QCPR® according to 2020 BLS guidelines. RESULTS: Sixty healthcare providers participated in this project. The median (IQR) ECC depths in the TTT, TFT and SPT in the first minute were 41 mm (40-42), 40 mm (38-41) and 40 mm (39-41), respectively, with $p < 0.001$. The median (IQR) ECC recoil in the TTT, TFT and SPT groups in the first minute was 15% (1-93), 64% (18-96) and 53% (8-95), respectively, with $p = 0.003$. The result in the second minute had similar findings. The SPT had the best QCPR score and less fatigue. CONCLUSION: The performance of chest compression depth and re-rebound ratio was statistically different among the three groups. TTT has good ECC depth and depth accuracy but poor recoil. TFT is the complete opposite. SPT can achieve a depth close to TTT and has a good recoil performance as TFT. Regarding comprehensive performance, SPT obtains the highest QCPR score, and SPT is also less fatigued. SPT may be an effective alternative technique for infant CPR.

2. Sci Rep. 2023 Dec 20;13(1):22734. doi: 10.1038/s41598-023-47502-0.
Sudden death in young South European population: a cross-sectional study of postmortem cases.
Carrington M(1), de Gouveia RH(2)(3)(4), Teixeira R(5)(6), Corte-Real F(2)(5), Gonçalves L(5)(6), Providência R(7)(8).
ABSTRACT
To describe the annual incidence and the leading causes of sudden non-cardiac and cardiac death (SCD) in children and young adult Portuguese population. We retrospectively reviewed autopsy of sudden unexpected deaths reports from the Portuguese National Institute of Legal Medicine and Forensic Sciences' database, between 2012 and 2016, for the central region of Portugal, Azores and Madeira (ages 1-40: 26% of the total population). During a 5-year period, 159 SD were identified, corresponding to an annual incidence of 2,4 (95%confidence interval, 1,5-3,6) per 100.000 people-years. Victims had a mean age of 32 ± 7 years-old, and 72,3% were male. There were 70,4% cardiac, 16,4% respiratory and 7,5% neurologic causes of SD. The most frequent cardiac anatomopathological diagnosis was atherosclerotic coronary artery disease (CAD) (33,0%). There were 15,2% victims with left ventricular hypertrophy, with a diagnosis of hypertrophic cardiomyopathy only possible in 2,7%. The prevalence of cardiac pathological findings of uncertain significance was 30,4%. In conclusion, the annual incidence of SD was low. Atherosclerotic CAD was diagnosed in 33,0% victims, suggesting the need to intensify primary prevention measures in the young. The high prevalence of pathological findings of uncertain significance emphasizes the importance of molecular autopsy and screening of first-degree relatives.

3. Scand J Trauma Resusc Emerg Med. 2023 Dec 21;31(1):106. doi: 10.1186/s13049-023-01165-y.
Favourable neurological outcome following paediatric out-of-hospital cardiac arrest: a retrospective observational study.
Fuchs A(#)(1)(2)(3), Bockemuehl D(#)(4), Jegerlehner S(5), Both CP(6), Cools E(7)(8), Riva T(9), Albrecht R(7)(4), Greif R(10)(11)(12), Mueller M(#)(5), Pietsch U(#)(7)(4)(5).
ABSTRACT
BACKGROUND: Out-of-hospital cardiac arrest (OHCA) in children is rare and can potentially result in severe neurological impairment. Our study aimed to identify characteristics of and factors associated with favourable neurological outcome following the resuscitation of children by the Swiss helicopter emergency medical service. MATERIALS AND METHODS: This retrospective observational study screened the Swiss Air-Ambulance electronic database from 01-01-2011 to 31-12-2021. We included all primary missions for patients ≤ 16 years with OHCA. The primary outcome was favourable neurological outcome after 30 days (cerebral performance categories (CPC) 1 and 2). Multivariable linear regression identified potential factors associated with favourable outcome (odd ratio - OR).

RESULTS: Having screened 110,331 missions, we identified 296 children with OHCA, which we included in the analysis. Patients were 5.0 [1.0; 12.0] years old and 61.5% (n = 182) male. More than two-thirds had a non-traumatic OHCA (67.2%, n = 199), while 32.8% (n = 97) had a traumatic OHCA. Thirty days after the event, 24.0% (n = 71) of patients were alive, 18.9% (n = 56) with a favourable neurological outcome (CPC 1 n = 46, CPC 2 n = 10). Bystander cardiopulmonary resuscitation (OR 10.34; 95%CI 2.29-51.42; p = 0.002) and non-traumatic aetiology (OR 11.07 2.38-51.42; p = 0.002) were the factors most strongly associated with favourable outcome. Factors associated with an unfavourable neurological outcome were initial asystole (OR 0.12; 95%CI 0.04-0.39; p < 0.001), administration of adrenaline (OR 0.14; 95%CI 0.05-0.39; p < 0.001) and ongoing chest compression at HEMS arrival (OR 0.17; 95%CI 0.04-0.65; p = 0.010). CONCLUSION: In this study, 18.9% of paediatric OHCA patients survived with a favourable neurologic outcome 30 days after treatment by the Swiss helicopter emergency medical service. Immediate bystander cardiopulmonary resuscitation and non-traumatic OHCA aetiology were the factors most strongly associated with a favourable neurological outcome. These results underline the importance of effective bystander and first-responder rescue as the foundation for subsequent professional treatment of children in cardiac arrest.

EXTRACORPOREAL LIFE SUPPORT

1. Resusc Plus. 2023 Dec 11;17:100521. doi: 10.1016/j.resplu.2023.100521. eCollection 2024 Mar.
Extracorporeal cardiopulmonary resuscitation for refractory out-of-hospital cardiac arrest: 10-year experience in a metropolitan cardiac arrest centre in Milan, Italy.
Scquizzato T(1), Calabrò MG(1), Franco A(1), Fominskiy E(1), Pieri M(1)(2), Nardelli P(1), Delrio S(1), Altizio S(1), Ortalda A(1), Melisurgo G(1), Ajello S(1), Landoni G(1)(2), Zangrillo A(1)(2), Scandroglio AM(1); ECPR-CARE Collaborators.
ABSTRACT
INTRODUCTION: Growing evidence supports extracorporeal cardiopulmonary resuscitation (ECPR) for refractory out-of-hospital cardiac arrest (OHCA) patients, especially in experienced centres. We present characteristics, treatments, and outcomes of patients treated with ECPR in a high-volume cardiac arrest centre in the metropolitan area of Milan, Italy and determine prognostic factors. METHODS: Refractory OHCA patients treated with ECPR between 2013 and 2022 at IRCCS San Raffaele Scientific Institute in Milan had survival and neurological outcome assessed at hospital discharge. RESULTS: Out of 307 consecutive OHCA patients treated with ECPR (95% witnessed, 66% shockable, low-flow 70 [IQR 58-81] minutes), 17% survived and 9.4% had favourable neurological outcome. Survival and favourable neurological outcome increased to 51% (OR = 8.7; 95% CI, 4.3-18) and 28% (OR = 6.3; 95% CI, 2.8-14) when initial rhythm was shockable and low-flow (time between CPR initiation and ROSC or ECMO flow) ≤60 minutes and decreased to 9.5% and 6.3% when low-flow exceeded 60 minutes (72% of patients). At multivariable analysis, shockable rhythm (aOR for survival = 2.39; 95% CI, 1.04-5.48), shorter low-flow (aOR = 0.95; 95% CI, 0.94-0.97), intermittent ROSC (aOR = 2.5; 95% CI, 1.2-5.6), and signs of life (aOR = 3.7; 95% CI, 1.5-8.7) were associated with better outcomes. Survival reached 10% after treating 104 patients (p for trend <0.001). CONCLUSIONS: Patients with initial shockable rhythm, intermittent ROSC, signs of life, and low-flow ≤60 minutes had higher success of ECPR for refractory OHCA. Favourable outcomes were possible beyond 60 minutes of low-flow, especially with concomitant favourable prognostic factors. Outcomes improved as the case-volume increased, supporting treatment in high-volume cardiac arrest centres.

2. Medicine (Baltimore). 2023 Dec 15;102(50):e35842. doi: 10.1097/MD.0000000000035842.
Neurological outcomes and quality of life in post-cardiac arrest patients with return of spontaneous circulation supported by ECMO: A retrospective case series.

Poveda-Henao C(1), Valenzuela-Faccini N(2), Pérez-Garzón M(1), Mantilla-Viviescas K(2), Chavarro-Alfonso O(2), Robayo-Amortegui H(2)(3).

ABSTRACT

Post-cardiac arrest brain injury constitutes a significant contributor to morbidity and mortality, leading to cognitive impairment and subsequent disability. Individuals within this patient cohort grapple with uncertainty regarding the potential advantages of extracorporeal life support (ECMO) cannulation. This study elucidates the neurological outcomes and quality of life of post-cardiac arrest patients who attained spontaneous circulation and underwent ECMO cannulation. This is a retrospective case study within a local context, the research involved 32 patients who received ECMO support following an intrahospital cardiac arrest with return of spontaneous circulation (ROSC). An additional 32 patients experienced cardiac arrest with ROSC before undergoing cannulation. The average age was 41 years, with the primary causes of cardiac arrest identified as acute coronary syndrome (46.8%), pulmonary thromboembolism (21.88%), and hypoxemia (18.7%). The most prevalent arrest rhythm was asystole (37.5%), followed by ventricular fibrillation (34.4%). The mean SOFA score was 7 points (IQR 6.5-9), APACHE II score was 12 (IQR 9-16), RESP score was -1 (IQR -1 to -4) in cases of respiratory ECMO, and SAVE score was -3 (IQR -5 to 2) in cases of cardiac ECMO. Overall survival was 71%, and at 6 months, the Barthel score was 75 points, modified Rankin score was 2, cerebral performance categories score was 1, and the SF-12 had an average score of 30. Notably, there were no significant associations between the time, cause, or rhythm of cardiac arrest and neurological outcomes. Importantly, cardiac arrest is not a contraindication for ECMO cannulation. A meticulous assessment of candidates who have achieved spontaneous circulation after cardiac arrest, considering the absence of early signs of poor neurological prognosis, is crucial in patient selection. Larger prospective studies are warranted to validate and extend these findings.

3. Heliyon. 2023 Nov 23;9(12):e22728. doi: 10.1016/j.heliyon.2023.e22728. eCollection 2023 Dec.

High incidence of acute kidney injury in extracorporeal resuscitation, Leading to poor prognosis.

Kim DK(1), Cho YS(1), Lee BK(1), Jeung KW(1), Jung YH(1), Lee DH(1), Kim MC(2), Lim YW(2), Kim DW(3), Lee KS(3), Jeong IS(3), Moon JM(1), Chun BJ(1), Ryu SJ(1).

ABSTRACT

BACKGROUND: Extracorporeal membrane oxygenation (ECMO) patients have a high incidence of acute kidney injury (AKI). Extracorporeal cardiopulmonary resuscitation (ECPR) patients are more likely to develop AKI than ECMO patients because of serious injury during cardiac arrest (CA). OBJECTIVES: This study aims to assess the occurrence and outcomes of AKI in ECPR and ECMO, and to identify specific risk factors and clinical implications of AKI in ECPR. METHODS: This is a retrospective observational study from a single tertiary care hospital in Gwangju, Korea. Adults (≥18 years) who received ECMO with cardiac etiology in the emergency and inpatient departments from January 2015 to December 2021 were included. The patients (n = 169) were divided into two groups, ECPR and ECMO without CA, and the occurrence of AKI was investigated. The primary outcome of the study was in-hospital mortality, and the secondary outcomes were six-month cerebral performance category (CPC) and AKI during hospitalization. RESULTS: The incidence of AKI was significantly higher with ECPR (67.5 %) than with ECMO without CA (38.4 %). ECPR was statistically significant for Expire (adjusted OR (aOR) 2.45, 95 % CI 1.28-4.66) and Poor CPC (2.59, 1.32-5.09). AKI was also statistically significant for Expire (6.69, 3.37-13.29) and Poor CPC (5.45, 2.73-10.88). AKI was the determining factor for the outcomes of ECPR (p = 0.01). CONCLUSIONS: ECPR patients are more likely to develop AKI than ECMO without CA patients. In ECPR patients, AKI leads to poor outcomes. Therefore, clinicians should be careful not to develop AKI in ECPR patients.

4. Resuscitation. 2023 Dec;193:109981. doi: 10.1016/j.resuscitation.2023.109981. Epub 2023 Sep 30.

Coronary features across the spectrum of out-of-hospital cardiac arrest with ST-elevation myocardial infarction (CAD-OHCA study).

Franco D(1), Goslar T(2), Radsel P(2), Luca N(3), Esposito G(3), Izzo R(3), Tesorio T(4), Barbato E(5), Noc M(6).

ABSTRACT

AIM: We hypothesized that adult patients with out-of-hospital cardiac arrest (OHCA) and ST-elevation myocardial infarction (STEMI) requiring prolonged resuscitation have more severe coronary artery disease (CAD) than those responding rapidly, and more severe CAD than patients with STEMI without OHCA. METHODS: Consecutive conscious and comatose OHCA patients with STEMI after reestablishment of spontaneous circulation (ROSC), and patients with refractory OHCA undergoing veno-arterial extracorporeal membrane oxygenation (E-CPR OHCA) were compared to STEMI without OHCA (STEMI no OHCA). CAD severity was assessed by a single physician blinded to the resuscitation method, time to ROSC and level of consciousness. RESULTS: Between 2016 and 2022, 71 conscious OHCA, 157 comatose OHCA, 50 E-CPR OHCA and 101 STEMI no OHCA underwent immediate coronary angiography. Acute culprit lesion was documented less often in OHCA (88.1% vs 97%; p = 0.009) but complete occlusion was more frequent (68.8% vs 58.4%; p = 0.038) than in STEMI no OHCA. SYNTAX score was 5.6 in STEMI no OHCA, 10.2 in conscious OHCA, 13.4 in comatose OHCA and 26.8 in E-CPR OHCA (p < 0.001). There was a linear correlation between SYNTAX score and delay to ROSC/ECMO initiation (r2 = 0.61; p < 0.001). Post PCI culprit TIMI 3 flow was comparable between the groups (≥86%). SYNTAX score was among independent predictors of 5-year survival which was significantly decreased in comatose OHCA (56.1%) and E-CPR OHCA (36.0%) compared to conscious OHCA (83.1%) and STEMI no OHCA (88.1%). CONCLUSION: Compared to STEMI no OHCA, OHCA was associated with increased incidence of acute coronary occlusion and more complex non culprit CAD which progressively increased from conscious OHCA to E-CPR OHCA. Severity of CAD was associated with increased delays to ROSC/ECMO initiation and decreased long term survival.

5. Crit Care Med. 2024 Jan 1;52(1):142-145. doi: 10.1097/CCM.0000000000006060. Epub 2023 Dec 14.

Testing the Age Limits of Extracorporeal Cardiopulmonary Resuscitation: How Old Is Too Old?

Fernando SM(1)(2), MacLaren G(3)(4), McIsaac DI(1)(5)(6), Brodie D(7).

NO ABSTRACT AVAILABLE

6. Resuscitation. 2023 Dec 13:110078. doi: 10.1016/j.resuscitation.2023.110078. Online ahead of print.

Primary and secondary analyses of trials of extracorporeal membrane oxygenation in refractory cardiac arrest: A silk purse or a sow's ear?

Goren E(1), Hoering A(1), Nichol G(1).

NO ABSTRACT AVAILABLE

7. J Am Heart Assoc. 2023 Dec 29:e031035. doi: 10.1161/JAHA.123.031035. Online ahead of print.

External Validation of the CAST and rCAST Score in Patients With Out-of-Hospital Cardiac Arrest Who Underwent Extracorporeal Cardiopulmonary Resuscitation: A Secondary Analysis of the SAVE-J II Study.

Misumi K(1)(2), Hagiwara Y(1), Kimura T(1), Hifumi T(3), Inoue A(4), Sakamoto T(5), Kuroda Y(6), Ogura T(1); SAVE-J II study group.

ABSTRACT

BACKGROUND: Risk stratification is important in patients with post-cardiac arrest syndrome. The Post-Cardiac Arrest Syndrome for Therapeutic Hypothermia (CAST) and revised CAST (rCAST) scores have been well validated for predicting neurological outcomes, particularly for conventionally resuscitated patients with post-cardiac arrest syndrome. However, no studies have evaluated patients undergoing extracorporeal cardiopulmonary resuscitation. METHODS AND RESULTS: Adult patients with out-of-hospital cardiac arrest who underwent extracorporeal cardiopulmonary

resuscitation were analyzed in this retrospective observational multicenter cohort study. We validated the accuracy of the CAST/rCAST scores for predicting neurological outcomes at 30 days. Moreover, we compared the predictive performance of these scores with the TiPS65 risk score derived from patients with out-of-hospital cardiac arrest who were resuscitated using extracorporeal cardiopulmonary resuscitation. A total of 1135 patients were analyzed. The proportion of patients with favorable neurological outcomes was 16.6%. In the external validation, the area under the receiver operating characteristic curve of the CAST score was significantly higher than that of the rCAST score (area under the receiver operating characteristic curve 0.677 versus 0.603; P<0.001), but there was no significant difference with that of the TiPS65 score (versus 0.633; P=0.154). Both CAST/rCAST risk scores showed good calibration (Hosmer-Lemeshow test: P=0.726 and 0.674), and the CAST score showed significantly better predictability in net reclassification compared with the rCAST (P<0.001) and TiPS65 scores (P=0.001). CONCLUSIONS: The prognostic accuracy of the CAST score was significantly better than that of other risk scores in net reclassification. The CAST score may help to predict neurological outcomes in patients with out-of-hospital cardiac arrest who undergo extracorporeal cardiopulmonary resuscitation. However, the predictive value of the CAST score was not sufficiently high for clinical application.

EXPERIMENTAL RESEARCH

1. Resuscitation. 2023 Dec 15:110092. doi: 10.1016/j.resuscitation.2023.110092. Online ahead of print.

A new method to evaluate carotid blood flow by continuous Doppler monitoring during cardiopulmonary resuscitation in a porcine model of cardiac arrest

Zhao X(1), Wang S(2), Yuan W(3), Wu J(3), Li C(4).

ABSTRACT

AIM: We used a wearable carotid Doppler patch to study carotid blood flow patterns in a porcine model of cardiac arrest to identify return of spontaneous circulation (ROSC) and hemodynamics associated with different arrhythmias and the quality of compressions. METHODS: Twenty Landrace pigs were used as models of cardiac arrest following a standard protocol. Carotid blood flow was monitored continuously using noninvasive ultrasound. Carotid spectral waveforms were captured during various arrhythmias and CPR. Typical carotid blood flow waveforms were recorded at the time of ROSC, and hemodynamic changes were compared with carotid blood flow parameters. RESULTS: The results showed that the carotid blood flow waveforms varied with ventricular arrhythmia type. During CPR, compression depth correlated significantly with carotid maximal velocity (Vmax) (Spearman correlation coefficient (r) = 0.682, P < 0.001) and velocity-time integral (VTI) (r = 0.794, P < 0.001). Vmax and VTI demonstrated moderate predictive value for survival. The regular carotid blood flow pattern towards the brain was observed during ROSC, concurrent with compression waveforms. After ROSC, VTI and carotid pulse volume (cPV) showed similar trends as stroke volume (SV). The carotid minute volume (cMV) exhibited a similar trend as cardiac output (CO). CONCLUSIONS: Carotid blood flow monitoring could provide valuable information about different arrhythmias as well as the quality of CPR. Carotid flow monitoring allows for timely and

effective identification of ROSC. In addition, it may provide valuable hemodynamic information after ROSC.

2. Crit Care. 2023 Dec 14;27(1):491. doi: 10.1186/s13054-023-04745-7.
Modulation of mitochondrial function with near-infrared light reduces brain injury in a translational model of cardiac arrest.
Wider JM(1)(2)(3), Gruley E(1)(2), Morse PT(4), Wan J(4), Lee I(5), Anzell AR(6), Fogo GM(1)(7), Mathieu J(1)(2)(3), Hish G(8), O'Neil B(9), Neumar RW(1)(2), Przyklenk K(10)(11), Hüttemann M(#)(4), Sanderson TH(#)(12)(13)(14)(15)(16).
ABSTRACT
BACKGROUND: Brain injury is a leading cause of morbidity and mortality in patients resuscitated from cardiac arrest. Mitochondrial dysfunction contributes to brain injury following cardiac arrest; therefore, therapies that limit mitochondrial dysfunction have the potential to improve neurological outcomes. Generation of reactive oxygen species (ROS) during ischemia-reperfusion injury in the brain is a critical component of mitochondrial injury and is dependent on hyperactivation of mitochondria following resuscitation. Our previous studies have provided evidence that modulating mitochondrial function with specific near-infrared light (NIR) wavelengths can reduce post-ischemic mitochondrial hyperactivity, thereby reducing brain injury during reperfusion in multiple small animal models. METHODS: Isolated porcine brain cytochrome c oxidase (COX) was used to investigate the mechanism of NIR-induced mitochondrial modulation. Cultured primary neurons from mice expressing mitoQC were utilized to explore the mitochondrial mechanisms related to protection with NIR following ischemia-reperfusion. Anesthetized pigs were used to optimize the delivery of NIR to the brain by measuring the penetration depth of NIR to deep brain structures and tissue heating. Finally, a model of out-of-hospital cardiac arrest with CPR in adult pigs was used to evaluate the translational potential of NIR as a noninvasive therapeutic approach to protect the brain after resuscitation. RESULTS: Molecular evaluation of enzyme activity during NIR irradiation demonstrated COX function was reduced in an intensity-dependent manner with a threshold of enzyme inhibition leading to a moderate reduction in activity without complete inhibition. Mechanistic interrogation in neurons demonstrated that mitochondrial swelling and upregulation of mitophagy were reduced with NIR treatment. NIR therapy in large animals is feasible, as NIR penetrates deep into the brain without substantial tissue heating. In a translational porcine model of CA/CPR, transcranial NIR treatment for two hours at the onset of return of spontaneous circulation (ROSC) demonstrated significantly improved neurological deficit scores and reduced histologic evidence of brain injury after resuscitation from cardiac arrest. CONCLUSIONS: NIR modulates mitochondrial function which improves mitochondrial dynamics and quality control following ischemia/reperfusion. Noninvasive modulation of mitochondria, achieved by transcranial treatment of the brain with NIR, mitigates post-cardiac arrest brain injury and improves neurologic functional outcomes.

3. Resusc Plus. 2023 Dec 20;17:100530. doi: 10.1016/j.resplu.2023.100530. eCollection 2024 Mar.
Lung tissue injury and hemodynamic effects of ventilations synchronized or unsynchronized to continuous chest compressions in a porcine cardiac arrest model.
Olasveengen TM(1)(2), Skåre C(1), Skjerven-Martinsen M(3), Hoff-Olsen P(3)(2), Kramer-Johansen J(4)(2), Hoff Nordum F(5), Eriksen M(6), Anderas Norseng P(6), Wik L(7).
ABSTRACT
AIM: Compare lung injury and hemodynamic effects in synchronized ventilations (between two chest compressions) vs. unsynchronized ventilations during cardiopulmonary resuscitation (CPR) in a porcine model of cardiac arrest. METHODS: Twenty pigs were randomized to either synchronized or

unsynchronized group. Ventricular fibrillation was induced electrically and left for 1.5 minutes. Four minutes of basic chest compression:ventilation (30:2) CPR was followed by eight minutes of either synchronized or unsynchronized ventilations (10/min) during continuous compressions before defibrillation was attempted. Aortic, right atrial and intracerebral pressures, carotid and cerebral blood flow and cardiac output were measured. Airway monitoring included capnography and respiratory function monitor. Macro- and microscopic lung injuries were assessed post-mortem. RESULTS: There were no significant differences between groups in any of the measured hemodynamic variables or inspiration time (0.4 vs. 1.0 s, $p = 0.05$). The synchronized ventilation group had lower median peak inspiratory airway pressure (57 vs. 94 cm H2O, $p < 0.001$), lower minute ventilation (3.7 vs. 9.4 l min-1, $p < 0.001$), lower pH (7.31 vs. 7.53, $p < 0.001$), higher pCO2 (5.2 vs. 2.5 kPa, $p < 0.001$) and lower pO2 (31.6 vs. 54.7 kPa, $p < 0.001$) compared to the unsynchronized group after 12 minutes of CPR. There was significant lung injury after CPR in both synchronized and unsynchronized groups. CONCLUSION: Synchronized and unsynchronized ventilations resulted in similar hemodynamics and lung injury during continuous mechanical compressions of pigs in cardiac arrest. Animals that received unsynchronized ventilations with one second inspiration time at a rate of ten ventilations per minute were hyperventilated and hyperoxygenated.

4. Resusc Plus. 2023 Oct 19;16:100488. doi: 10.1016/j.resplu.2023.100488. eCollection 2023 Dec.
Percutaneous left ventricular assist devices in refractory cardiac arrest: The role of chest compressions.
Gottula AL(1), McCracken BM(2), Nakashima T(3), Greer NL(3), Cramer TA(3), Sutton NR(4)(5), Ward KR(3), Neumar RW(3), Hakam Tiba M(3), Hsu CH(3).
ABSTRACT
BACKGROUND: Recent studies describe an emerging role for percutaneous left ventricular assist devices such as Impella CP® as rescue therapy for refractory cardiac arrest. We hypothesized that the addition of mechanical chest compressions to percutaneous left ventricular assist device assisted CPR would improve hemodynamics by compressing the right ventricle and augmenting pulmonary blood flow and left ventricular filling. We performed a pilot study to test this hypothesis using a swine model of prolonged cardiac arrest. METHODS: Eight Yorkshire swine were anesthetized, intubated, and instrumented for hemodynamic monitoring. They were subjected to untreated ventricular fibrillation for 5.75 (SD 2.90) minutes followed by mechanical chest compressions for a mean of 20.0 (SD 5.0) minutes before initiation of percutaneous left ventricular assist device. After percutaneous left ventricular assist device initiation, mechanical chest compressions was stopped ($n = 4$) or continued ($n = 4$). Defibrillation was attempted 4, 8 and 12 minutes after initiating percutaneous left ventricular assist device circulatory support. RESULTS: The percutaneous left ventricular assist device + mechanical chest compressions group had significantly higher percutaneous left ventricular assist device flow prior to return of spontaneous heartbeat at four- and twelve-minutes after percutaneous left ventricular assist device initiation, and significantly higher end tidal CO2 at 4-minutes after percutaneous left ventricular assist device initiation, when compared with the percutaneous left ventricular assist device alone group. Carotid artery flow was not significantly different between the two groups. CONCLUSION: The addition of mechanical chest compressions to percutaneous left ventricular assist device support during cardiac arrest may generate higher percutaneous left ventricular assist device and carotid artery flow prior to return of spontaneous heartbeat compared to percutaneous left ventricular assist device alone. Further

studies are needed to determine if this approach improves other hemodynamic parameters or outcomes after prolonged cardiac arrest.

CASE REPORTS

1. J Cardiol Cases. 2023 Sep 1;28(6):250-252. doi: 10.1016/j.jccase.2023.08.012. eCollection 2023 Dec.

Cliff diving leading to commotio cordis in a patient with Ebstein's anomaly.

Gozun M(1), Vu K(1), Nishimura Y(1), Ghukasyan H(1), Zhang J(1), Kemble-Luo A(1)(2), Singh D(1)(2).

ABSTRACT

In this case report, we describe a 23-year-old male with Ebstein's anomaly who experienced out-of-hospital cardiac arrest due to commotio cordis following cliff diving. The patient previously underwent a Cone procedure and re-do reduction tricuspid valvuloplasty. Comprehensive investigations revealed no new ischemic events or structural abnormalities. He received an implantable cardioverter-defibrillator during an uneventful outpatient visit. This is the first reported case of commotio cordis in a patient with Ebstein's anomaly, suggesting a potential increased risk in individuals with congenital heart diseases. This highlights the significance of tertiary prevention in such cases. LEARNING OBJECTIVE: Through this case, readers may be able to review the incidence and electrical abnormalities leading to sudden cardiac death in patients with commotio cordis, the clinical presentation and mechanism of injury, and the current consensus regarding the management of commotio cordis.

2. ACG Case Rep J. 2023 Dec 20;10(12):e01223. doi: 10.14309/crj.0000000000001223. eCollection 2023 Dec.

Necrotizing Pancreatitis After Cardiac Arrest With Cardiopulmonary Resuscitation.

Donat C(1), Farah M(2), Jobbins K(1).

ABSTRACT

Acute pancreatitis has been reported as a complication of cardiac arrest and cardiopulmonary resuscitation. However, necrotizing pancreatitis as a subsequent complication has not. Because pancreatic necrosis develops 7-10 days after the initial episode of pancreatitis, it may be difficult to identify and, therefore, diagnose. This case details the course of a patient who developed infected necrotizing pancreatitis after receiving cardiopulmonary resuscitation after cardiac arrest.

3. Clin Case Rep. 2023 Dec 18;11(12):e8340. doi: 10.1002/ccr3.8340. eCollection 2023 Dec.

Fatal myocardial infarction investigated using contrast-enhanced postmortem computed tomography: A case report.

Aoe K(1), Orita Y(2), Oshita C(2), Date S(3), Teragawa H(2).

ABSTRACT

Conventional autopsies are considered standard methods for clarifying cause of death. However, because of the increasing use of computed tomography, magnetic resonance imaging, and other diagnostic imaging techniques, autopsy imaging is now more frequently adopted to identify diseases with unknown causes and sudden deaths. A 84-year-old man was diagnosed with acute myocardial infarction using coronary angiography. After taking oral antiplatelet medication in the catheterization laboratory, the patient suddenly coughed violently, lost consciousness, and was diagnosed with cardiac arrest. Spontaneous circulation did not return after 50 min of cardio-pulmonary resuscitation. To elucidate the cause of the cardiac arrest, we performed contrast-enhanced postmortem computed tomography (PMCT), which revealed cardiac tamponade due to

cardiac rupture of the inferior myocardium. Our findings reaffirm the effectiveness of contrast-enhanced PMCT in the diagnosis of sudden death in the clinical setting.

4. SAGE Open Med Case Rep. 2023 Dec 20;11:2050313X231220803. doi: 10.1177/2050313X231220803. eCollection 2023.
Cardiac arrest in the setting of probable catastrophic antiphospholipid syndrome in young patient with a history of COVID infection and polyglandular disorder-Case report.
Nahidi SM(1), Garg Y(1), Mahadeo DS(2), Sharma M(1), Acosta C(1), Seetharam K(1), Obi MF(1).
ABSTRACT
Antiphospholipid syndrome is an autoimmune disorder characterized by arterial and venous thrombosis and recurrent spontaneous abortions due to the persistent presence of antiphospholipid antibodies. Probable Catastrophic antiphospholipid (Catastrophic antiphospholipid-like syndrome) is a life-threatening presentation of antiphospholipid syndrome which manifests as intravascular thrombosis, leading to rapid onset of symptoms and involvement of multiple organ systems. We present a case of a 28-year-old woman with a history of polyglandular autoimmune syndrome, systemic lupus erythematosus, provoked bilateral deep vein thrombosis in the setting of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection 2 years prior, and hypothyroidism who presents with a cardiac arrest in the setting of an acute ST-elevation myocardial infarction with thromboembolic occlusion of two coronary arteries simultaneously in the setting of noncompliance with anticoagulation for the past 1 week. Her presentation was further complicated by acute hypoxic respiratory failure due to diffuse alveolar hemorrhage during the hospital course with progressive multiorgan failure and eventual death. Catastrophic antiphospholipid is associated with high morbidity and mortality, thus a timely diagnosis and multidisciplinary approach to management is needed for evaluation and management.

5. SAGE Open Med Case Rep. 2023 Dec 20;11:2050313X231220792. doi: 10.1177/2050313X231220792. eCollection 2023.
Haloperidol-induced sudden cardiac arrest in a recently detected HIV and hepatitis C patient: A unique case report.
Tamang K(1), Kc B(1), Kuikel S(1), Thapa S(2).
ABSTRACT
We herein described a case of a 45-year-old male recently detected with HIV and Hepatitis C who presented with signs of sepsis, developed delirium, and received haloperidol. Surprisingly, 10 min after intravenous administration, the patient developed Torsades de pointes and required immediate resuscitation. The report discusses the limited instances of cardiac arrest linked to haloperidol use, despite its generally perceived safety. The patient had no apparent risk factors, emphasizing the need for increased caution when administering haloperidol, particularly in critically ill patients with HIV and Hepatitis C.

6. Future Cardiol. 2023 Dec 19. doi: 10.2217/fca-2023-0107. Online ahead of print.
Massive anterior mediastinal lipoma causing cardiac arrest in a middle-aged male: a case report and literature review.
Weng X(1), Jiang L(2), Zhou M(1).
ABSTRACT
Lipoma is a common benign soft tissue tumor, but its size and location can lead to serious issues. We report a case of a 48 year-old male patient who experienced sudden cardiac arrest outside the hospital. After resuscitation and examination, we determined that this was due to a massive mediastinal lipoma compressing the lungs, leading to respiratory failure and pulmonary

encephalopathy, ultimately resulting in cardiac arrest. This case serves as a reminder to promptly identify and manage chest lipomas to avoid compression and functional impairment of the respiratory system. Early evaluation and treatment of massive lipomas are crucial for preventing complications.

7. Med Intensiva (Engl Ed). 2023 Dec 26:S2173-5727(23)00257-6. doi: 10.1016/j.medine.2023.12.005. Online ahead of print.
Massive pseudoaneurysm complicated with cardiac arrest after COVID 19 related myocardial infarction.
Roca-Guerrero C(1), Arenas-Loriente A(1), Andrea R(2).
NO ABSTRACT AVAILABLE

8. Heliyon. 2023 Dec 4;10(1):e23337. doi: 10.1016/j.heliyon.2023.e23337. eCollection 2024 Jan 15.
Case report: Maternal cardiac arrest at 12 hours postpartum.
Nivatpumin P(1), Lertkovit S(1).
ABSTRACT
Maternal cardiac arrest is a rare occurrence. In this case report, we present a detailed account of a 37-year-old pregnant woman with preeclampsia with severe features who underwent cesarean delivery. The patient experienced dyspnea and hypoxia at 12 hours postpartum, leading to cardiac arrest in the maternity ward. Advanced cardiac life support measures, including 15 minutes of chest compressions, were performed until spontaneous circulation was restored. This study explores the underlying factors contributing to maternal cardiac arrest during the postpartum period. Additionally, it highlights the effective strategies employed by our multidisciplinary team in managing and resolving this critical medical event.

9. Toxicon. 2023 Dec 23:107572. doi: 10.1016/j.toxicon.2023.107572. Online ahead of print.
Thromboembolic events following a pit viper bite from Protobothrops mucrosquamatus (Taiwan Habu): A report of two cases.
Sun I(1), Lee ST(2), Chen YG(3), Mao YC(4), Chen FC(1), Chen YH(5), Tsai SH(6), Ho CH(7).
ABSTRACT
Protobothrops mucrosquamatus, also known as the Taiwan Habu, is a venomous snake prevalent in Taiwan. It is accountable for most snakebites in the region. The toxin of the Taiwan Habu has significant hemorrhagic potential. However, patients bitten by this snake often suffer more local injuries than systemic ones. This report presents two cases of individuals bitten by the Taiwan Habu who subsequently experienced thromboembolism. In the first case, an 88-year-old male, bitten on his fourth toe, suffered a cerebral infarction 32 hours post-bite. In the second case, an 82-year-old female, bitten on her ankle, experienced cardiac arrest 19 hours later. Both patients promptly received antivenom and showed no signs of coagulopathy either before or after the snakebite. However, elevated coagulation factor VIII levels were observed in the first case. Our aim is to understand the mechanism behind these thromboembolic events. This report emphasizes the unusually high level of coagulation factor VIIIa and highlights the need for further investigation into the mechanisms involved. Consequently, physicians should assess the risk of thromboembolic events in snakebite patients by evaluating coagulation factors during treatment.

10. Rev Esp Anestesiol Reanim (Engl Ed). 2023 Dec 22:S2341-1929(23)00202-0. doi: 10.1016/j.redare.2023.12.005. Online ahead of print.
Veno-venal extracorporeal membrane oxygenation to support whole-lung lavage in a severe case of pulmonary alveolar proteinosis.

Martínez-Solano J(1), Sousa-Casasnovas I(2), Santa-Teresa P(3), García-López JJ(4), Maestu LP(4), Martínez-Sellés M(5).

ABSTRACT

We present the case of a 71-year-old woman with severe bilateral primary alveolar proteinosis admitted for bilateral whole lung lavage (WLL) with a double-lumen endotracheal tube. She had a cardiac arrest of respiratory origin during the procedure and recovered after one minute of advanced resuscitation. A second LLP was scheduled under respiratory support with veno-venous extracorporeal membrane oxygenation (VV-ECMO). During this second WLL the patient was completely VV-ECMO-dependent, and the procedure was successfully completed. She was gradually weaned over the next 48 h. The patient was finally discharged after clinical improvement and home oxygen therapy was discontinued. WLL is the treatment of choice for severe cases of alveolar proteinosis. In rare cases the intervention may be poorly tolerated due to the degree of lung involvement. This case illustrates how VV-ECMO support is an option that may benefit this subgroup of at-risk patients.

11. J Pediatr Nurs. 2023 Nov-Dec;73:e455-e460. doi: 10.1016/j.pedn.2023.10.015. Epub 2023 Nov 11.

Quality improvement developments following pediatric resuscitation and veno-arterial extracorporeal membrane oxygenation support due to a massive intentional antidepressant overdose.

Berry DL(1).

ABSTRACT

Extracorporeal Membrane Oxygenation Cardiopulmonary Resuscitation (ECPR) is the act of placing a patient on bypass at the bedside while simultaneously carrying out life-sustaining interventions such as chest compressions or epinephrine administration. This involves a team of physicians, nurses, respiratory therapists, pharmacists, extracorporeal membrane oxygenation (ECMO) trained staff, and other health professionals who must focus on cardiopulmonary resuscitation (CPR), cannulation, and initiating ECMO flow at the same time. ECPR may be considered when traditional CPR does not achieve return of spontaneous circulation (ROSC) in a patient. Limitations when thinking about using ECPR for a patient include location, timing from arrest to CPR initiation, as well as CPR initiation to successfully on bypass, trained staff available to begin the cannulation process, and pauses in compressions during surgery. We analyzed a pediatric patient who required ECPR after an intentional drug overdose. Gaps identified in this case prompted us to assess our ECPR protocol. Through the development and use of multidisciplinary ECPR simulations, our team discovered areas of quality improvement and put those findings into practice.