This week's PubMed 7th – 13th May 2023: articles of interest n = 44

CPR AND COVID-19

No articles identified.

CPR/MECHANICAL CHEST COMPRESSION

1. Wilderness Environ Med. 2023 May 9:S1080-6032(23)00051-0. doi: 10.1016/j.wem.2023.03.006. Online ahead of print.

Manual vs Mechanical Cardiopulmonary Resuscitation for Out-of-Hospital Cardiac Arrest on a Ski Slope: A Pilot Study.

Rupp SL(1), Overberger RC(2).

ABSTRACT

INTRODUCTION: The quality of cardiopulmonary resuscitation (CPR) is critical in increasing the probability of survival with a good neurologic outcome after out-of-hospital cardiac arrest. In an austere environment with a potentially salvageable patient, bystanders or first responders may need to provide chest compressions for a prolonged duration or during physically challenging transportation scenarios. Consequently, they may be at risk of fatigue or injury, and chest compression quality may deteriorate. The study sought to assess whether or not access to and utilization of a mechanical compression device (Lund University Cardiopulmonary Assist System) was feasible and not inferior to manual compressions while extricating and transporting a patient from a ski slope. METHODS: Variable 3-person ski patrol teams responded to a simulated patient with out-of-hospital cardiac arrest in a nonshockable rhythm. Using a mannequin and CPR quality monitor, performance during manual CPR was compared with that of a mechanical compression device. This is a prospective, crossover analysis of CPR quality during extrication from a ski slope. Across 8 total runs, chest compression fraction, which is the proportion of time without spontaneous circulation during which compressions occurred, and high-quality CPR, as measured by appropriate rate and depth, were compared between the 2 groups. Extrication times between the 2 groups were also measured. RESULTS: There was no difference in compression fraction between the manual (91.4%; 95% CI [86.8-96.1]) and mechanical arms (92.8%; 95% CI [88.8-96.8]) (P=0.67). There was an increase in the time performing high-quality CPR in the mechanical group (58.5%; 95% CI [45.8-71.2]) vs that in the manual group (25.6%; 95% CI [13.5-37.8]) (P<0.001). There was a statistically significant difference in the extrication times between the 2 groups, 7.6 ± 0.5 min in the manual group vs 8.6 ± 0.4 min in the mechanical group (P=0.014). CONCLUSIONS: Mechanical CPR devices are noninferior for use in ski areas during initial resuscitation and transportation. Compared with manual CPR, mechanical CPR would likely improve the fraction of time performing high-quality CPR.

2. Int J Numer Method Biomed Eng. 2023 May 11:e3718. doi: 10.1002/cnm.3718. Online ahead of print.

The effect of thoracic dimensions on compression depth during cardiopulmonary resuscitation.

Moradicheghamahi J(1), Fortuny G(1), López JM(1), Puigjaner D(1), Herrero J(2), Azeli Y(3)(4)(5).

ABSTRACT

The effect of the dimensions of the thoracic cage on the resuscitation outcome of cardiopulmonary resuscitation (CPR) maneuvers has long been debated. In this study, the effect of changes in the rib cage dimensions on the achieved compression depth was investigated using finite element simulations. A total of 216 different rib cage geometry models were considered and, in each case,

the result of applying different levels of compression force up to 600 N were simulated. The Haller Index of the rib cage is defined as the ratio of the transverse diameter and the antero-posterior diameter. Our results suggest that, with a fixed level of compression force, performing CPR on rib cages having a low Haller Index and/or a larger height leads to compression depths below the average. Alternatively, if a target compression depth is set for CPR, in general a lower compression force would be required for individuals with higher Haller Index and/or lower chest height. In addition, present results indicate that wider chested individuals will experience lower stress levels on their ribs to achieve the required CPR target depth. Moreover, in the present study we propose predictive models, based on anthropometric parameters, for compression depth and rib stress during chest compressions. In particular, the model suggests that in future correlations of empirical CPR data the patients' Haller index and vertical (sagittal) cross-area are the best parameters to be used as independent variables in a fit.

REGISTRIES, REVIEWS AND EDITORIALS

1. Semin Cardiothorac Vasc Anesth. 2023 May 12:10892532231176854. doi: 10.1177/10892532231176854. Online ahead of print.
Year in Review 2022: Noteworthy Literature in Cardiothoracic Critical Care.
Alber S(1), Tanabe K(1), Tregear H(1), Hennigan A(1), Gilliland S(1).
ABSTRACT
The past year in critical care medicine was notable for ongoing sequelae of the COVID-19 pandemic, including nationwide shortages and critical care demand in many regions in excess of usual operating capacity. Despite these challenges, evidence-based medicine and investigations into the optimal management of the critically ill continued to be at the forefront. This article is a collection of studies published in 2022 which are specifically relevant to cardiothoracic critical care. These noteworthy publications add to the existing literature across a broad spectrum of topics, from optimal timing of mechanical circulatory support (MCS), delirium prevention, updates in nutrition guidelines, alternative defibrillation techniques, novel ventilator management, and observing the downstream psychological impact of extracorporeal membrane oxygenation (ECMO) therapy.

2. JAMA Netw Open. 2023 May 1;6(5):e2312684. doi: 10.1001/jamanetworkopen.2023.12684.
Disentangling the Complex Web of Out-of-Hospital Cardiac Arrest Socioeconomic Disparities.
Huebinger R(1)(2), Del Rios M(3).
NO ABSTRACT AVAILABLE

3. Neth Heart J. 2023 May 9. doi: 10.1007/s12471-023-01786-z. Online ahead of print.
Why not try harder to prove that a text message alert system for trained volunteers saves lives after cardiac arrest?
Calle P(1)(2).
NO ABSTRACT AVAILABLE

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2023 May 5:109822. doi: 10.1016/j.resuscitation.2023.109822. Online ahead of print.
Associations between comorbidity and health-related quality of life among in-hospital cardiac arrest survivors - A cross-sectional nationwide registry study.

Israelsson J(1), Koistinen L(2), Årestedt K(3), Rooth M(2), Bremer A(4).
ABSTRACT
AIM: The aim of this study was to explore associations between comorbidities and health-related quality of life (HRQoL) among in-hospital cardiac arrest (IHCA) survivors. METHODS: This registry study is based on data from the Swedish Registry of Cardiopulmonary Resuscitation (SRCR) collected during 2014-2017. HRQoL was assessed using the EQ-5D-5L, the EQ Visual Analogue Scale (EQ VAS) and the Hospital Anxiety and Depression Scale (HADS). In total, 1,278 IHCA survivors were included in the study, 3-6 months after the cardiac arrest (CA). Data were analyzed with descriptive and inferential statistics. The comorbidities analysed in this study were the patients' status for diabetes, previous myocardial infarction, previous stroke, respiratory insufficiency, and heart failure. RESULTS: Overall, the IHCA survivors reported high levels of HRQoL, but there was great variation within the population, e.g., EQ VAS median (q1-q3)=70 (50-80). Survivors with one or more comorbidities reported worse HRQoL in 6 out of 8 outcomes ($p<0.001$). All studied comorbidities were each associated with worse HRQoL, but no comorbidity was associated with every outcome measure. Previous stroke and respiratory insufficiency were significantly associated with every outcome measure except for HADS Anxiety. The linear regression models explained 4-8 % of the total variance in HRQoL ($p<0.001$). CONCLUSION: Since IHCA survivors with comorbidities report worse HRQoL compared to those without comorbidities, it is important to pay directed attention to them when developing and providing post-CA care, especially in those with respiratory insufficiency and previous stroke.

INJURIES AND CPR

1. Resuscitation. 2023 May 8:109823. doi: 10.1016/j.resuscitation.2023.109823. Online ahead of print.
Duration of cardiopulmonary resuscitation and phenotype of post-cardiac arrest brain injury.
Coppler PJ(1), Elmer J(2), Doshi A(1), Guyette FX(1), Okubo M(1), Ratay C(1), Frisch AN(1), Steinberg A(2), Weissman A(1), Arias V(3), Drumheller BC(1), Flickinger KL(1), Faro J(4), Schmidhofer M(5), Rhinehart ZJ(1), Hansra BS(6), Fong-Isariyawongse J(7), Barot N(7), Baldwin ME(7), Murat Kaynar A(8), Darby JM(9), Shutter LA(3), Mettenburg J(10), Callaway CW(11); University of Pittsburgh PostCardiac Arrest; Service.
ABSTRACT
BACKGROUND: Patients resuscitated from cardiac arrest have variable severity of primary hypoxic ischemic brain injury (HIBI). Signatures of primary HIBI on brain imaging and electroencephalography (EEG) include diffuse cerebral edema and burst suppression with identical bursts (BSIB). We hypothesize distinct phenotypes of primary HIBI are associated with increasing cardiopulmonary resuscitation (CPR) duration. METHODS: We identified from our prospective registry of both in-and out-of-hospital CA patients treated between January 2010 to January 2020 for this cohort study. We abstracted CPR duration, neurological examination, initial brain computed tomography gray to white ratio (GWR), and initial EEG pattern. We considered four phenotypes on presentation: awake; comatose with neither BSIB nor cerebral edema (non-malignant coma); BSIB; and cerebral edema (GWR ≤ 1.20). BSIB and cerebral edema were considered as non-mutually exclusive outcomes. We generated predicted probabilities of brain injury phenotype using localized regression. RESULTS: We included 2,440 patients, of whom 545 (23%) were awake, 1,065 (44%) had non-malignant coma, 548 (23%) had BSIB and 438 (18%) had cerebral edema. Only 92 (4%) had both BSIB and edema. Median CPR duration was 16 [IQR 8-28] minutes. Median CPR duration increased in a stepwise manner across groups: awake 6 [3-13] minutes; non-malignant coma 15 [8-25] minutes; BSIB 21 [13-31] minutes; cerebral edema 32 [22-46] minutes. Predicted probability of phenotype changes over time.

CONCLUSIONS: Brain injury phenotype is related to CPR duration, which is a surrogate for severity of HIBI. The sequence of most likely primary HIBI phenotype with progressively longer CPR duration is awake, coma without BSIB or edema, BSIB, and finally cerebral edema.

CAUSE OF THE ARREST

1. Eur Heart J Cardiovasc Pharmacother. 2023 May 12:pvad033. doi: 10.1093/ehjcvp/pvad033. Online ahead of print.

Sodium-glucose cotransporter-2 inhibitors compared with glucagon-like-peptide-1 receptor agonists and out-of-hospital cardiac arrest in type 2 diabetes: a nationwide nested case-control study.

Júlíusdóttir YK(1), Halili A(2)(3), Coronel R(4), Folke F(1)(5)(6), Torp-Pedersen C(2)(7), Gislason GH(1)(8), Eroglu TE(1).

ABSTRACT

AIMS: Sodium-glucose cotransporter-2 inhibitors (SGLT-2is) are antidiabetic drugs that have beneficial direct effects on the myocardium by impacting cardiac ion channels and exchangers that control cardiac electrophysiology. We investigated the relationship between SGLT-2is in comparison to glucagon-like peptide-1 receptor agonists (GLP-1as) and out-of-hospital cardiac arrest (OHCA) in individuals with type 2 diabetes. METHODS: Using data from Danish registries, we conducted a nationwide nested case-control study in a cohort of individuals with type 2 diabetes between 2013 and 2019. Cases were defined as OHCA victims from presumed cardiac causes and each case was randomly matched with five controls without OHCA based on age, sex, and index-date (OHCA date). Conditional logistic regression models were used to estimate the adjusted odds ratios (ORs) with 95% confidence interval (95% CI) of OHCA comparing SGLT-2i use with GLP-1as (reference). RESULTS: The study population consisted of 3 618 OHCA cases and 18 090 matched controls. SGLT-2i was used by 91 cases and 593 controls, and was associated with reduced odds of OHCA compared with use of GLP-1a after controlling for the relevant confounders (adjusted OR 0.76 [95% CI:0.58-0.99]). The adjusted OR of OHCA associated with SGLT-2i use did not vary significantly by sex (p-value interaction: 0.461), pre-existing cardiac disease (p-value interaction: 0.762), heart failure (p-value interaction: 0.891), diabetes duration (p-value interaction: 0.101) and chronic kidney disease (p-value interaction: 0.894). CONCLUSION: Use of SGLT-2i is associated with a reduced risk of OHCA compared with use of GLP-1a in type 2 diabetes.

2. Open Heart. 2023 May;10(1):e002223. doi: 10.1136/openhrt-2022-002223.

Long-term stress conditions and out-of-hospital cardiac arrest risk: a nested case-control study.

Eroglu TE(1)(2), Coronel R(3), Halili A(4)(5), Kessing LV(6), Arulmurugananthavadivel A(7), Parveen S(7), Folke F(8), Torp-Pedersen C(4)(9), Gislason GH(7).

ABSTRACT

OBJECTIVE: Patients with stress-related disorders and anxiety are at increased risk of developing cardiovascular disease. However, the risk of out-of-hospital cardiac arrest (OHCA) is scarcely investigated. We aimed to establish whether long-term stress (post-traumatic stress disorder, adjustment disorder) or anxiety is associated with OHCA in the general population. METHODS: We conducted a nested case-control study in a nationwide cohort of individuals between 1 June 2001 and 31 December 2015 in Denmark. Cases were OHCA patients with presumed cardiac causes. Each case was matched by age, sex and date of OHCA with 10 non-OHCA controls from the general population. HRs for OHCA were derived from Cox models after controlling for common OHCA risk factors. Stratified analyses were performed according to sex, age and pre-existing cardiovascular disease. RESULTS: We included 35 195 OHCAs and 351 950 matched controls (median age 72 years;

66.8% male). Long-term stress conditions were diagnosed in 324 (0.92%) OHCA cases and 1577 (0.45%) non-OHCA controls, and were associated with higher rate of OHCA (HR 1.44, 95% CI 1.27 to 1.64). Anxiety was diagnosed in 299 (0.85%) OHCA cases and 1298 (0.37%) controls, and was associated with increased rate of OHCA (HR 1.56, 95% CI1.37 to 1.79). We found no interaction with sex, age or history of cardiovascular diseases. CONCLUSION: Patients with stress-related disorders or anxiety have an increased rate of OHCA. This association applies equally to men and women and is independent from the presence of cardiovascular disease. Awareness of the higher risks of OHCA in patients with stress-related disorders and anxiety is important when treating these patients.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

1. Eur J Cardiovasc Nurs. 2023 May 8:zvad041. doi: 10.1093/eurjcn/zvad041. Online ahead of print.
The effect of standalone audio-visual feedback devices on the quality of chest compressions during laypersons' CPR training: A Systematic review and meta-analysis.
Kahsay DT(1), Peltonen LM(2), Rosio R(2), Tommila M(3), Salanterä S(4).
ABSTRACT
AIM: Individual studies that investigated the effect of standalone audio-visual feedback (AVF) devices during laypersons' cardiopulmonary resuscitation (CPR) training have yielded conflicting results. This review aimed to evaluate the effect of standalone AVF devices on the quality of chest compressions during laypersons' CPR training. METHOD AND RESULT: Randomized controlled trials of simulation studies recruiting participants without actual patient CPR experience were included. The intervention evaluated was the quality of chest compressions with standalone AVF devices vs without AVF devices. Databases, such as PubMed, Cochrane Central, Embase, CINAHL, Web of Science, and PsycINFO, were searched from January 2010 to January 2022. The risk of bias was assessed using the Cochrane risk of bias tool. A meta-analysis alongside a narrative synthesis was used for examining the effect of standalone AVF devices.Sixteen studies were selected for this systematic review. A meta-analysis revealed an increased compression depth of 2.22 mm [95% CI, 0.88-3.55), p = 0.001] when participants performed CPR using the feedback devices. Besides, AVF devices enabled laypersons to deliver compression rates closer to the recommended range of 100-120 per min. No improvement was noted in chest recoil and hand positioning when participants used standalone AVF devices. CONCLUSION: The quality of the included studies was variable, and different standalone AVF devices were used. Standalone AVF devices were instrumental in guiding laypersons to deliver deeper compressions without compromising the quality of compression rates. However, the devices did not improve the quality of chest recoil and placement of the hands.

DRUGS

1. Chest. 2023 May;163(5):1007-1008. doi: 10.1016/j.chest.2022.11.031.

Regarding the Comparative Effectiveness of Lidocaine and Amiodarone for Treatment of In-Hospital Cardiac Arrest.
Murphy TW(1), Kadir S(2).
NO ABSTRACT AVAILABLE

TRAUMA

1. Eur J Trauma Emerg Surg. 2023 May 10. doi: 10.1007/s00068-023-02279-9. Online ahead of print.
Stay and play or load and go? The association of on-scene advanced life support interventions with return of spontaneous circulation following traumatic cardiac arrest.
Smida T(1), Price BS(2), Scheidler J(2), Crowe R(2), Wilson A(2), Bardes J(2).
ABSTRACT
INTRODUCTION: Traumatic out-of-hospital cardiac arrest (tOHCA) has a mortality rate over 95%. Many current protocols dictate rapid intra-arrest transport of these patients. We hypothesized that on-scene advanced life support (ALS) would increase the odds of arriving at the emergency department with ROSC (ROSC at ED) in comparison to performance of no ALS or ALS en route. METHODS: We utilized the 2018-2021 ESO Research Collaborative public use datasets for this study, which contain patient care records from ~2000 EMS agencies across the US. All OHCA patients with an etiology of "trauma" or "exsanguination" were screened (n=15,691). The time of advanced airway management, vascular access, and chest decompression was determined for each patient. Logistic regression modeling was used to evaluate the association of ALS intervention timing with ROSC at ED. RESULTS: 4942 patients met inclusion criteria. 14.6% of patients had ROSC at ED. In comparison to no vascular access, on-scene (aOR: 2.14 [1.31, 3.49]) but not en route vascular access was associated with increased odds of having ROSC at ED arrival. In comparison to no chest decompression, neither en route nor on-scene chest decompression were associated with ROSC at ED arrival. Similarly, in comparison to no advanced airway management, neither en route nor on-scene advanced airway management were associated with ROSC at ED arrival. The odds of ROSC at ED decreased by 3% (aOR: 0.97 [0.94, 0.99]) for every 1-minute increase in time to vascular access and decreased by 5% (aOR: 0.95 [0.94, 0.99]) for every 1-minute increase in time to epinephrine. CONCLUSION: On-scene ALS interventions were associated with increased ROSC at ED in our study. These data suggest that initiating ALS prior to rapid transport to definitive care in the setting of tOHCA may increase the number of patients with a palpable pulse at ED arrival.

VENTILATION

No articles identified.

CERERBRAL MONITORING

1. Front Neurol. 2023 Apr 20;14:1136197. doi: 10.3389/fneur.2023.1136197. eCollection 2023.
A resting-state functional magnetic resonance imaging study of altered functional brain activity in cardiac arrest survivors with good neurological outcome.
Wu Q(1), Wang GN(2), Hu H(1), Chen XF(2), Xu XQ(1), Zhang JS(2), Wu FY(1).
ABSTRACT
PURPOSE: To investigate the spontaneous brain activity alterations in survivors of cardiac arrest (CA) with good neurological outcome using resting-state functional magnetic resonance imaging (rs-fMRI) with amplitude of low-frequency fluctuation (ALFF) and regional homogeneity (ReHo) methods.

MATERIALS AND METHODS: Thirteen CA survivors with favorable neurological outcomes and 13 healthy controls (HCs) were recruited and underwent rs-fMRI scans. The ALFF and ReHo methods were applied to assess the regional intensity and synchronization of spontaneous brain activity. Correlation analyses were performed to explore the relationships between the mean ALFF and ReHo values in significant clusters and clinical parameters. RESULTS: The survivors of CA showed significantly decreased ALFF values in the left postcentral gyrus and precentral gyrus and increased ALFF values in the left hippocampus and parahippocampal gyrus than HCs. Significantly decreased ReHo values were observed in the left inferior occipital gyrus and middle occipital gyrus in the patients. Mean ALFF values in the left hippocampus and parahippocampal gyrus were positively correlated with the time to return of spontaneous circulation ($r = 0.794$, $p = 0.006$) in the patient group. CONCLUSION: Functional activity alterations in the brain areas corresponding to known cognitive and physical impairments were observed in CA survivors with preserved neurological function. Our results could advance the understanding of the neurological mechanisms underlying the residual deficits in those patients.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Resuscitation. 2023 May 11:109832. doi: 10.1016/j.resuscitation.2023.109832. Online ahead of print.

Validation of the rCAST Score and Comparison to the PCAC and FOUR Scores for Prognostication after Out-of-Hospital Cardiac Arrest.

Kim N(1), Kitlen E(1), Garcia G(1), Khosla A(2), Elliott Miller P(3), Johnson J(4), Wira C(5), Greer DM(6), Gilmore EJ(1), Beekman R(7).

ABSTRACT

AIM: Early, accurate outcome prediction after out-of-hospital cardiac arrest (OHCA) is critical for clinical decision-making and resource allocation. We sought to validate the revised post-Cardiac Arrest Syndrome for Therapeutic hypothermia (rCAST) score in a United States cohort and compare its prognostic performance to the Pittsburgh Cardiac Arrest Category (PCAC) and Full Outline of UnResponsiveness (FOUR) scores. METHODS: This is a single-center, retrospective study of OHCA patients admitted between January 2014-August 2022. Area under the receiver operating curve (AUC) was computed for each score for predicting poor neurologic outcome at discharge and in-hospital mortality. We compared the scores' predictive abilities via Delong's test. RESULTS: Of 505 OHCA patients with all scores available, the medians [IQR] for rCAST, PCAC, and FOUR scores were 9.5 [6.0, 11.5], 4 [3,4], and 2 [0, 5], respectively. The AUC [95% confidence interval] of the rCAST, PCAC, and FOUR scores for predicting poor neurologic outcome were 0.815 [0.763 - 0.867], 0.753 [0.697 - 0.809], and 0.841 [0.796 - 0.886], respectively. The AUC [95% confidence interval] of the rCAST, PCAC, and FOUR scores for predicting mortality were 0.799 [0.751 - 0.847], 0.723 [0.673 - 0.773], and 0.813 [0.770 - 0.855], respectively. The rCAST score was superior to the PCAC score for predicting mortality ($p=0.017$). The FOUR score was superior to the PCAC score for predicting poor neurological outcome ($p<0.001$) and mortality ($p<0.001$). CONCLUSION: The rCAST score can reliably predict poor outcome in a United States cohort of OHCA patients regardless of TTM status and outperforms the PCAC score.

2. J Am Heart Assoc. 2023 May 9:e8322. doi: 10.1161/JAHA.122.028449. Online ahead of print.
Association of Degree of Urbanization and Survival in Out-of-Hospital Cardiac Arrest.
Gregers MCT(1)(2), Møller SG(1), Kjoelbye JS(1)(2), Jakobsen LK(1)(2), Grabmayr AJ(1)(2), Kragh AR(1)(2), Hansen CM(1)(3), Torp-Pedersen C(4)(5), Andelius L(1)(6), Ersbøll AK(1)(7), Folke F(1)(2)(8).
ABSTRACT
Background Survival from out-of-hospital cardiac arrest (OHCA) varies across regions. The aim of this study was to evaluate the association between urbanization (rural, suburban, and urban areas), bystander interventions (cardiopulmonary resuscitation and defibrillation), and 30-day survival from OHCAs in Denmark. Methods and Results We included OHCAs not witnessed by ambulance staff in Denmark from January 1, 2016, to December 31, 2020. Patients were divided according to the Eurostat Degree of Urbanization Tool in rural, suburban, and urban areas based on the 98 Danish municipalities. Poisson regression was used to estimate incidence rate ratios. Logistic regression (adjusted for ambulance response time) tested differences between the groups with respect to bystander interventions and survival, according to degree of urbanization. A total of 21 385 OHCAs were included, of which 8496 (40%) occurred in rural areas, 7025 (33%) occurred in suburban areas, and 5864 (27%) occurred in urban areas. Baseline characteristics, as age, sex, location of OHCA, and comorbidities, were comparable between groups. The annual incidence rate ratio of OHCA was higher in rural areas (1.54 [95% CI, 1.48-1.58]) compared with urban areas. Odds for bystander cardiopulmonary resuscitation were lower in suburban (0.86 [95% CI, 0.82-0.96]) and urban areas (0.87 [95% CI, 0.80-0.95]) compared with rural areas, whereas bystander defibrillation was higher in urban areas compared with rural areas (1.15 [95% CI, 1.01-1.31]). Finally, 30-day survival was higher in suburban (1.13 [95% CI, 1.02-1.25]) and urban areas (1.17 [95% CI, 1.05-1.30]) compared with rural areas. Conclusions Degree of urbanization was associated with lower rates of bystander defibrillation and 30-day survival in rural areas compared with urban areas.

3. BMC Emerg Med. 2023 May 6;23(1):46. doi: 10.1186/s12873-023-00803-z.
The association between the experience of lay responders and response interval to medical emergencies in a rural area: an observational study.
Starck SM(#)(1), Jensen JJ(#)(2), Sarkisian L(3), Schakow H(4), Andersen C(5), Henriksen FL(3).
ABSTRACT
AIM: The aim of this retrospective observational study was to determine how response intervals correlated to the experience of the community first responders (CFRs) using data collected from the Danish Island of Langeland via a global positioning system (GPS)-based system. METHODS: All medical emergency calls involving CFRs in the time period from 21st of April 2012 to 31st of December 2017 were included. Each emergency call activated 3 CFRs. Response intervals were calculated using the time from when the system alerted the CFRs to CFR time of arrival at the emergency site measured by GPS. CFRs response intervals were grouped depending on their level of experience according to ≤ 10, 11-24, 25-49, 50-99, ≥ 100 calls accepted and arrived on-site. RESULTS: A total of 7273 CFR activations were included. Median response interval for the CFR arriving first on-site (n = 3004) was 4:05 min (IQR 2:42-6:01) and median response interval for the arrival of the CFR with an automated external defibrillator (n = 2594) was 5:46 min (IQR 3:59-8:05). Median response intervals were 5:53 min (3:43-8:29) for ≤ 10 calls (n = 1657), 5:39 min (3:49-8:01) for 11-24 calls (n = 1396), 5:45 min (3:49-8:00) for 25-49 calls (n = 1586), 5:07 min (3:38-7:26) for 50-99 calls (n = 1548) and 4:46 min (3:14-7:32) for ≥ 100 calls (n = 1086) ($p < 0.001$). There was a significant negative correlation between experience and response intervals ($p < 0.001$, Spearman's rho = -0.0914). CONCLUSION: This study found an inverse correlation between CFR experience and response intervals, which could lead to increased survival after a time-critical incident.

4. Cochrane Database Syst Rev. 2023 May 9;5(5):CD013619. doi: 10.1002/14651858.CD013619.pub2.

Family presence during resuscitation.

Afzali Rubin M(1), Svensson TL(2), Herling SF(3)(4), Jabre P(5)(6)(7), Møller AM(1)(4).

ABSTRACT

BACKGROUND: Patients and their relatives often expect to be actively involved in decisions of treatment. Even during resuscitation and acute medical care, patients may want to have their relatives nearby, and relatives may want to be present if offered the possibility. The principle of family presence during resuscitation (FPDR) is a triangular relationship where the intervention of family presence affects the healthcare professionals, the relatives present, and the care of the patient involved. All needs and well-being must be balanced in the context of FPDR as the actions involving all three groups can impact the others. OBJECTIVES: The primary aim of this review was to investigate how offering relatives the option to be present during resuscitation of patients affects the occurrence of post-traumatic stress disorder (PTSD)-related symptoms in the relatives. The secondary aim was to investigate how offering relatives the option to be present during resuscitation of patients affects the occurrence of other psychological outcomes in the relatives and what effect family presence compared to no family presence during resuscitation of patients has on patient morbidity and mortality. We also wanted to investigate the effect of FPDR on medical treatment and care during resuscitation. Furthermore, we wanted to investigate and report the personal stress seen in healthcare professionals and if possible describe their attitudes toward the FPDR initiative. SEARCH METHODS: We searched CENTRAL, MEDLINE, Embase, PsycINFO, and CINAHL from inception to 22 March 2022 without any language limits. We also checked references and citations of eligible studies using Scopus, and searched for relevant systematic reviews using Epistomonikos. Furthermore, we searched ClinicalTrials.gov, WHO ICTRP, and ISRCTN registry for ongoing trials; OpenGrey for grey literature; and Google Scholar for additional trials (all on 22 March 2022). SELECTION CRITERIA: We included randomized controlled trials of adults who have witnessed a resuscitation attempt of a patient (who was their relative) at the emergency department or in the pre-hospital emergency medical service. The participants of this review included relatives, patients, and healthcare professionals during resuscitation. We included relatives aged 18 years or older who have witnessed a resuscitation attempt of a patient (who is their relative) in the emergency department or pre-hospital. We defined relatives as siblings, parents, spouses, children, or close friends of the patient, or any other descriptions used by the study authors. There were no limitations on adult age or gender. We defined patient as a patient with cardiac arrest in need of cardio-pulmonary resuscitation (CPR), a patient with a critical medical or traumatic life-threatening condition, an unconscious patient, or a patient in any other way at risk of sudden death. We included all types of healthcare professionals as described in the included studies. There were no limitations on age or gender. DATA COLLECTION AND ANALYSIS: We checked titles and abstracts of studies identified by the search, and obtained the full reports of those studies deemed potentially relevant. Two review authors independently extracted data. As it was not possible to conduct meta-analyses, we synthesized data narratively. MAIN RESULTS: The electronic searches yielded a total of 7292 records after deduplication. We included 2 trials (3 papers) involving a total of 595 participants: a cluster-randomized trial from 2013 involving pre-hospital emergency medical services units in France, comparing systematic offer for a relative to witness CPR with the traditional practice, and its 1-year assessment; and a small pilot study from 1998 of FPDR in an emergency department in the UK. Participants were 19 to 78 years old, and between 56% and 64% were women. PTSD was measured with the Impact of Event Scale, and the median score ranged from 0 to 21 (range 0 to 75; higher scores correspond to more severe disease). In the trial that accounted for most of the included participants (570/595), the frequency of PTSD-related symptoms was significantly higher in

the control group after 3 and 12 months, and in the per-protocol analyses a significant statistical difference was found in favor of FPDR when looking at PTSD, anxiety and depression, and complicated grief after 1 year. One of the included studies also measured duration of patient resuscitation and personal stress in healthcare professionals during FPDR and found no difference between groups. Both studies had high risk of bias, and the evidence for all outcomes except one was assessed as very low certainty. AUTHORS' CONCLUSIONS: There was insufficient evidence to draw any firm conclusions on the effects of FPDR on relatives' psychological outcomes. Sufficiently powered and well-designed randomized controlled trials may change the conclusions of the review in future.

5. Resuscitation. 2023 May 11:109833. doi: 10.1016/j.resuscitation.2023.109833. Online ahead of print.

Resuscitation Quality Improvement® (RQI®) HeartCode® Complete Program Improves Chest Compression Rate in Real World Out-of Hospital Cardiac Arrest Patients.

Li T(1), Essex K(2), Ebert D(2), Levinsky B(2), Gilley C(3), Luo D(4), Alper E(4), Barbara P(5), Rolston DM(6), Berkowitz J(2), Chakraborty P(7).

ABSTRACT

BACKGROUND: The Resuscitation Quality Improvement® (RQI®) HeartCode© Complete program is designed to enhance cardiopulmonary resuscitation (CPR) training by using real-time feedback manikins. Our objective was to assess the quality of CPR, such as chest compression rate, depth, and fraction, performed on out-of-hospital cardiac arrest (OHCA) patients among paramedics trained with the RQI program vs. paramedics who were not. METHODS AND RESULTS: Adult OHCA cases from 2021 were analyzed; 353 OHCA cases were classified into one of three groups: 1) 0 RQI®-trained paramedics, 2) 1 RQI®-trained paramedic, and 3) 2-3 RQI®-trained paramedics. We reported the median of the average compression rate, depth, and fraction, as well as percent of compressions that were between 100 to 120/minute and percent of compressions that were 2.0 to 2.4 inches deep. Kruskal-Wallis Tests were used to assess differences in these metrics across the three groups of paramedics. Of 353 cases, the median of the average compression rate/minute among crews with 0, 1, and 2-3 RQI®-trained paramedics was 130, 125, and 125, respectively (p=0.0032). Median percent of compressions between 100 to 120 compressions/minute was 10.3%, 19.7%, and 20.1% among crews with 0, 1, and 2-3 RQI®-trained paramedics, respectively (p=0.0010). Median of the average compression depth was 1.7 inches across all three groups (p=0.4881). Median compression fraction was 86.4%, 84.6%, and 85.5% among crews with 0, 1, and 2-3 RQI-trained paramedics, respectively (p=0.6371). CONCLUSIONS: RQI® training was associated with statistically significant improvement in chest compression rate, but not improved chest compression depth or fraction in OHCA.

6. JAMA Netw Open. 2023 May 1;6(5):e2312722. doi: 10.1001/jamanetworkopen.2023.12722.

Evaluation of Socioeconomic Position and Survival After Out-of-Hospital Cardiac Arrest in Korea Using Structural Equation Modeling.

Choi DH(1)(2), Ro YS(1)(3)(4), Park JH(1)(3)(4), Lee SY(1)(5), Hong KJ(1)(3)(4), Song KJ(1)(4)(6), Shin SD(1)(3)(4).

ABSTRACT

IMPORTANCE: The association between low socioeconomic position (SEP) and poor survival after out-of-hospital cardiac arrest (OHCA) has not been thoroughly investigated. OBJECTIVES: To evaluate the association between individual SEP and survival after OHCA and to identify any mediating pathways using structural equation modeling (SEM). DESIGN, SETTING, AND PARTICIPANTS: This is a retrospective cohort study that used data collected from January 2013 to December 2019.

Participants were adults with OHCA with a presumed cardiac etiology. The study was conducted in Korea, which has a universal health insurance system. Data were analyzed from January 2022 to February 2023. EXPOSURES: Individual SEP was measured by insurance type (National Health Insurance [NHI] and medical aid [MA]) and premiums. SEP was categorized into 5 groups, in which NHI beneficiaries were divided into quartiles (Q1, highest quartile; Q4, lowest quartile), and MA was the lowest SEP group. MAIN OUTCOMES AND MEASURES: The primary outcome was survival to discharge. The association between SEP and OHCA survival was examined using multivariable logistic regression, and mediating factors were identified using SEM. RESULTS: A total of 121 516 patients (median [IQR] age, 73 [60-81] years; 43 912 [36.1%] female patients) were included. Compared with the NHI Q1 group, individuals with lower SEP had lower odds of survival to discharge. The adjusted odds ratios of survival to discharge were 0.97 (95% CI, 0.94-1.00), 0.88 (95% CI, 0.85-0.91), 0.91 (95% CI, 0.88-0.94), and 0.53 (95% CI, 0.50-0.56) for the NHI Q2, NHI Q3, NHI Q4, and MA groups, respectively. Several factors were found to mediate the association of SEP and survival in the total study population, with mediating proportions of 15.1% (95% CI, 11.8%-18.4%) for witnessed status, 4.8% (95% CI, 3.5%-6.0%) for bystander cardiopulmonary resuscitation provision, 41.8% (95% CI, 35.4%-48.1%) for initial rhythm, and 9.4% (95% CI, 7.4%-11.4%) for emergency department level. Among patients who survived to hospital admission, the mediation proportions were 11.8% (95% CI, 6.7%-16.9%) for witnessed status, 3.7% (95% CI, 1.3%-6.1%) for bystander cardiopulmonary resuscitation provision, 56.2% (95% CI, 41.0%-71.4%) for initial rhythm, 10.7% (95% CI, 6.1%-15.3%) for emergency department level, 20.2% (95% CI, 14.0%-26.5%) for coronary angiography, and 4.2% (95% CI, 2.2%-6.1%) for targeted temperature management. CONCLUSIONS AND RELEVANCE: In this cohort study of patients with OHCA, lower individual SEP was significantly associated with lower survival to discharge. Potentially modifiable mediators can be targeted for public health interventions to reduce disparities in survival among patients with OHCA of different SEP.

7. Curr Probl Cardiol. 2023 May 10:101794. doi: 10.1016/j.cpcardiol.2023.101794. Online ahead of print.

Racial Disparity in Outcomes of Out-of-Hospital Cardiac Arrest (OHCA): A Systematic Review and Meta-Analysis.

Larik MO(1), Shiraz MI(2), Shah ST(2), Shiraz SA(3), Shiraz M(4).

ABSTRACT

Out-of-hospital Cardiac Arrest (OHCA) is the abrupt cessation of cardiac function outside of a hospital setting. With limited research into the presence of racial disparities among outcomes of OHCA patients, this systematic review and meta-analysis was conducted. PubMed, Cochrane, and Scopus were searched from inception to March 2023. This analysis includes a total of 53,507 black patients, and 185,173 white patients, resulting in the pooling of 238,680 patients in this meta-analysis. It was observed that the black population was associated with significantly worsened survival to hospital discharge (OR: 0.81; 95% CI: 0.68, 0.96, P = 0.01), return of spontaneous circulation (OR: 0.79; 95% CI: 0.69, 0.89, P = 0.0002), and neurological outcomes (OR: 0.80; 95% CI: 0.68, 0.93; P = 0.003) when compared to their white counterparts. However, there were no differences found with respect to mortality. To the best of our knowledge, this is the most comprehensive meta-analysis assessing racial disparities in OHCA outcomes that have never been explored before. Increased awareness programs, and greater racial inclusivity in the field of cardiovascular medicine is encouraged. Further studies are needed in order to arrive at a robust conclusion.

8. J Am Heart Assoc. 2023 May 9:e027756. doi: 10.1161/JAHA.122.027756. Online ahead of print.

Factors Impacting Treatment of Out-of-Hospital Cardiac Arrest: A Qualitative Study of Emergency Responders.

Missel AL(1), Dowker SR(1)(2)(3), Dzierwa D(2), Krein SL(4)(5)(6), Coulter-Thompson EI(1)(4), Williams M(1), Trumpower B(2), Swor R(7), Hunt N(3)(8), Friedman CP(1).

ABSTRACT

Background Of the more than 250 000 emergency medical services-treated out-of-hospital cardiac arrests that occur each year in the United States, only about 8% survive to hospital discharge with good neurologic function. Treatment for out-of-hospital cardiac arrest involves a system of care that includes complex interactions among multiple stakeholders. Understanding the factors inhibiting optimal care is fundamental to improving outcomes. Methods and Results We conducted group interviews with emergency responders including 911 telecommunicators, law enforcement officers, firefighters, and transporting emergency medical services personnel (ie, emergency medical technicians and paramedics) who responded to the same out-of-hospital cardiac arrest incident. We used the American Heart Association System of Care as the framework for our analysis to identify themes and their contributory factors from these interviews. We identified 5 themes under the structure domain, which included workload, equipment, prehospital communication structure, education and competency, and patient attitudes. In the process domain, 5 themes were identified focusing on preparedness, field response and access to patient, on-scene logistics, background information acquisition, and clinical interventions. We identified 3 system themes including emergency responder culture; community support, education, and engagement; and stakeholder relationships. Three continuous quality improvement themes were identified, which included feedback provision, change management, and documentation. Conclusions We identified structure, process, system, and continuous quality improvement themes that may be leveraged to improve outcomes for out-of-hospital cardiac arrest. Interventions or programs amenable to rapid implementation include improving prearrival communication between agencies, appointing patient care and logistical leadership on-scene, interstakeholder team training, and providing more standardized feedback to all responder groups.

POST-CARDIAC ARREST TREATMENTS

1. Singapore Med J. 2023 Apr 27. doi: 10.4103/singaporemedj.SMJ-2021-354. Online ahead of print.

Post-resuscitation care of patients with return of spontaneous circulation after out-of-hospital cardiac arrest at the emergency department.

Jackie Lam JK(1), Pek JH(1).

ABSTRACT

INTRODUCTION: Out-of-hospital-cardiac-arrest (OHCA) is a major public health challenge and post-return-of-spontaneous-circulation (ROSC) goals have shifted from just survival to survival with intact neurology. Although post-ROSC care is crucial for survival with intact neurology, there are insufficient well-established protocols for post-resuscitation care. We aimed to evaluate post-resuscitation care in the emergency department (ED) of adult (aged ≥16 years) OHCA patients with sustained ROSC and its associated neurologically intact survival. METHODS: A retrospective review of electronic medical records was conducted for OHCA patients with sustained ROSC at the ED. Data including demographics, pre-hospital resuscitation, ED resuscitation, post-resuscitation care and eventual outcomes were analysed. RESULTS: Among 921 OHCA patients, 85 (9.2%) had sustained ROSC at the ED. Nineteen patients (19/85, 22.4%) survived, with 13 (13/85, 15.3%) having intact neurology at discharge. Electrocardiogram and chest X-ray were performed in all OHCA patients, whereas computed tomography (CT) was performed inconsistently, with CT brain being most common (74/85, 87.1%), while CT pulmonary angiogram (6/85, 7.1%), abdomen and pelvis (4/85, 4.7%) and aortogram (2/85, 2.4%) were done infrequently. Only four patients (4.7%) had all five

neuroprotective goals of normoxia, normocarbia, normotension, normothermia and normoglycaemia achieved in the ED. The proportion of all five neuroprotective goals being met was significantly higher (P = 0.01) among those with neurologically intact survival (3/13, 23.1%) than those without (1/72, 1.4%). CONCLUSION: Post-resuscitation care at the ED showed great variability, indicating gaps between recommended guidelines and clinical practice. Good quality post-resuscitation care, centred around neuroprotection goals, must be initiated promptly to achieve meaningful survival with intact neurology.

2. Diagnostics (Basel). 2023 Apr 24;13(9):1523. doi: 10.3390/diagnostics13091523.
Lactate versus Phosphate as Biomarkers to Aid Mechanical Circulatory Support Decisions in Patients with Out-of-Hospital Cardiac Arrest and Return of Spontaneous Circulation.
Duse DA(1), Voß F(1), Heyng L(1), Wolff G(1), Quast C(1), Scheiber D(1), Horn P(1), Kelm M(1)(2), Westenfeld R(1)(3), Jung C(1), Erkens R(1).
ABSTRACT
AIMS: Identifying patients who may benefit from mechanical circulatory support (MCS) after out-of-hospital cardiac arrest (OHCA) and return of spontaneous circulation (ROSC) remains challenging; thus, a search for helpful biomarkers is warranted. We aimed to evaluate phosphate and lactate levels on admission regarding their associations with survival with and without MCS. METHODS: In 224 OHCA patients who achieved ROSC, the initial phosphate and lactate levels were investigated to discriminate in-hospital mortality by receiver operating characteristic (ROC) curves. According to the Youden Index (YI) from the respective ROC, the groups were risk stratified by both biomarkers, and 30-day mortality was analyzed in patients with and without MCS. RESULTS: Within the entire collective, MCS was not associated with a better chance of survival. Both phosphate and lactate level elevations showed good yet comparable discriminations to predict mortality (areas under the curve: 0.80 vs. 0.79, p = 0.74). In patients with initial phosphate values > 2.2 mmol/L (>YI), 30-day mortality within the MCS cohort was lower (HR 2.3, 95% CI: 1.4-3.7; p = 0.0037). In patients with lower phosphate levels and groups stratified by lactate, 30-day mortality was similar in patients with and without MCS. CONCLUSIONS: We found a significant association between survival and MCS therapy in patients with phosphate levels above 2.2 mmol/L (Youden Index), and a similar discrimination of patient overall survival by lactate and phosphate. Prospective studies should assess the possible independent prognostic value of phosphate and its clearance for MCS efficiency.

3. Resuscitation. 2023 May 8:109820. doi: 10.1016/j.resuscitation.2023.109820. Online ahead of print.
CT-scan after cardiac arrest: allegro ma non troppo.
Benghanem S(1), Cariou A(2).
NO ABSTRACT AVAILABLE

TARGETED TEMPERATURE MANAGEMENT

1. Chest. 2023 May;163(5):1120-1129. doi: 10.1016/j.chest.2022.10.023. Epub 2022 Oct 30.
Differential Effect of Targeted Temperature Management Between 32 °C and 36 °C Following Cardiac Arrest According to Initial Severity of Illness: Insights From Two International Data Sets.
Lascarrou JB(1), Dumas F(2), Bougouin W(3), Legriel S(4), Aissaoui N(5), Deye N(6), Beganton F(7), Lamhaut L(8), Jost D(9), Vieillard-Baron A(10), Nichol G(11), Marijon E(7), Jouven X(7), Cariou A(5); SDEC Investigators.
ABSTRACT
BACKGROUND: Recent guidelines have emphasized actively avoiding fever to improve outcomes in patients who are comatose following resuscitation from cardiac arrest (ie, out-of-hospital cardiac arrest). However, whether targeted temperature management between 32 °C and 36 °C (TTM32-36)

can improve neurologic outcome in some patients remains debated. RESEARCH QUESTION: Is there an association between the use of TTM32-36 and outcome according to severity assessed at ICU admission using a previously derived risk score? STUDY DESIGN AND METHODS: Data prospectively collected in the Sudden Death Expertise Center (SDEC) registry (France) between May 2011 and December 2017 and in the Resuscitation Outcomes Consortium Continuous Chest Compressions (ROC-CCC) trial (United States and Canada) between June 2011 and May 2015 were used for this study. Severity at ICU admission was assessed through a modified version of the Cardiac Arrest Hospital Prognosis (mCAHP) score, divided into tertiles of severity. The study explored associations between TTM32-36 and favorable neurologic status at hospital discharge by using multiple logistic regression as well as in tertiles of severity for each data set. RESULTS: A total of 2,723 patients were analyzed in the SDEC data set and 4,202 patients in the ROC-CCC data set. A favorable neurologic status at hospital discharge occurred in 728 (27%) patients in the French data set and in 1,239 (29%) patients in the North American data set. Among the French data set, TTM32-36 was independently associated with better neurologic outcome in the tertile of patients with low (adjusted OR, 1.63; 95% CI, 1.15-2.30; P = .006) and high (adjusted OR, 1.94; 95% CI, 1.06-3.54; P = .030) severity according to mCAHP at ICU admission. Similar results were observed in the North American data set (adjusted ORs of 1.36 [95% CI, 1.05-1.75; P = .020] and 2.42 [95% CI, 1.38-4.24; P = .002], respectively). No association was observed between TTM32-36 and outcome in the moderate groups of the two data sets. INTERPRETATION: TTM32-36 was significantly associated with a better outcome in patients with low and high severity at ICU admission assessed according to the mCAHP score. Further studies are needed to evaluate individualized temperature control following out-of-hospital cardiac arrest.

2. Resuscitation. 2023 May 11:109831. doi: 10.1016/j.resuscitation.2023.109831. Online ahead of print.

Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest; The effect on post-intervention serum concentrations of sedatives and analgesics and time to awakening.

Annborn M(1), Ceric A(2), Borgquist O(3), During J(4), Moseby-Knappe M(5), Lybeck A(3).

ABSTRACT

BACKGROUND: This study investigated the association of two levels of targeted temperature management (TTM) after out-of-hospital cardiac arrest (OHCA) with administered doses of sedative and analgesic drugs, serum concentrations, and the effect on time to awakening. METHODS: This substudy of the TTM2-trial was conducted at three centers in Sweden, with patients randomized to either hypothermia or normothermia. Deep sedation was mandatory during the 40-hour intervention. Blood samples were collected at the end of TTM and end of protocolized fever prevention (72 hours). Samples were analysed for concentrations of propofol, midazolam, clonidine, dexmedetomidine, morphine, oxycodone, ketamine and esketamine. Cumulative doses of administered sedative and analgesic drugs were recorded. RESULTS: Seventy-one patients were alive at 40 hours and had received the TTM-intervention according to protocol. 33 patients were treated at hypothermia and 38 at normothermia. There were no differences between cumulative doses and concentration and of sedatives/analgesics between the intervention groups at any timepoint. Time until awakening was 53 hours in the hypothermia group compared to 46 hours in the normothermia group (p=0.09). CONCLUSION: This study of OHCA patients treated at normothermia versus hypothermia found no significant differences in dosing or concentration of sedatives or analgesic drugs in blood samples drawn at the end of the TTM intervention, or at end of protocolized fever prevention, nor the time to awakening.

3. World J Emerg Med. 2023;14(3):217-223. doi: 10.5847/wjem.j.1920-8642.2023.056.

Effect of post-rewarming fever after targeted temperature management in cardiac arrest patients: a systematic review and meta-analysis.

Guo GQ(1), Ma YN(1), Xu S(1), Zhang HR(1), Sun P(1).

ABSTRACT

BACKGROUND: Targeted temperature management (TTM), as a therapeutic temperature control strategy for cardiac arrest (CA), is recommended by guidelines. However, the relationship between post-rewarming fever (PRF) and the prognosis of CA patients is unclear. Therefore, we aim to summarize the studies regarding the influence of PRF on patients with CA. METHODS: EMBASE, PubMed, and Cochrane Central databases were searched from inception to March 13, 2022. Randomized clinical trials (RCTs) and cohort studies on PRF in CA patients were included. According to the heterogeneity, the meta-analysis was performed using a random effects model or fixed effects model to calculate the pooled odds ratios (ORs) and corresponding 95% confidence intervals (CI s). The outcome data were unfavorable neurological outcome and mortality. RESULTS: The meta-analysis included 11 observational studies involving 3,246 patients. The results of the meta-analysis show that PRF (body temperature >38.0 °C) has no effect on the neurological outcome of CA patients (OR 0.71, 95% CI 0.43-1.17, I 2 82%) and has a significant relationship with lower mortality (OR 0.63; 95% CI 0.49-0.80, I 2 39%). However, PRF with a stricter definition (body temperature >38.5 °C) was associated with worse neurological outcome (OR 1.44, 95% CI 1.08-1.92, I 2 45%) and higher mortality (OR 1.71, 95% CI 1.25-2.35, I 2 47%). CONCLUSION: This study suggests that PRF >38.0 °C may not affect the neurological outcome and have a lower mortality in CA patients who completed TTM. However, PRF >38.5 °C is a potential prognostic factor for worse outcomes in CA patients.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. Sensors (Basel). 2023 May 5;23(9):4500. doi: 10.3390/s23094500.

Deep Learning Strategy for Sliding ECG Analysis during Cardiopulmonary Resuscitation: Influence of the Hands-Off Time on Accuracy.

Krasteva V(1), Didon JP(2), Ménétré S(2), Jekova I(1).

ABSTRACT

This study aims to present a novel deep learning algorithm for a sliding shock advisory decision during cardiopulmonary resuscitation (CPR) and its performance evaluation as a function of the cumulative hands-off time. We retrospectively used 13,570 CPR episodes from out-of-hospital cardiac arrest (OHCA) interventions reviewed in a period of interest from 30 s before to 10 s after regular analysis of automated external defibrillators (AEDs). Three convolutional neural networks (CNNs) with raw ECG input (duration of 5, 10, and 15 s) were applied for the shock advisory decision during CPR in 26 sequential analyses shifted by 1 s. The start and stop of chest compressions (CC) can occur at arbitrary times in sequential slides; therefore, the sliding hands-off time (sHOT) quantifies the cumulative CC-free portion of the analyzed ECG. An independent test with CPR episodes in 393 ventricular fibrillations (VF), 177 normal sinus rhythms (NSR), 1848 other non-shockable rhythms (ONR), and 3979 asystoles (ASYS) showed a substantial improvement of VF sensitivity when increasing the analysis duration from 5 s to 10 s. Specificity was not dependent on the ECG analysis duration. The 10 s CNN model presented the best performance: 92-94.4% (VF), 92.2-94% (ASYS), 96-97% (ONR), and 98.2-99.5% (NSR) for sliding decision times during CPR; 98-99% (VF), 98.2-99.8% (ASYS), 98.8-99.1 (ONR), and 100% (NSR) for sliding decision times after end of CPR. We identified the importance of sHOT as a reliable predictor of performance, accounting for the minimal sHOT interval of 2-3 s that provides a reliable rhythm detection satisfying the American Heart Association (AHA) standards for AED rhythm analysis. The presented technology for sliding

shock advisory decision during CPR achieved substantial performance improvement in short hands-off periods (>2 s), such as insufflations or pre-shock pauses. The performance was competitive despite 1-2.8% point lower ASYS detection during CPR than the standard requirement (95%) for non-noisy ECG signals. The presented deep learning strategy is a basis for improved CPR practices involving both continuous CC and CC with insufflations, associated with minimal CC interruptions for reconfirmation of non-shockable rhythms (minimum hands-off time) and early treatment of VF (minimal pre-shock pauses).

2. Front Physiol. 2023 Apr 20;14:1113524. doi: 10.3389/fphys.2023.1113524. eCollection 2023.
Real-time amplitude spectrum area estimation during chest compression from the ECG waveform using a 1D convolutional neural network.
Zuo F(1), Dai C(1)(2), Wei L(1), Gong Y(1), Yin C(3), Li Y(1).
ABSTRACT
Introduction: Amplitude spectrum area (AMSA) is a well-established measure than can predict defibrillation outcome and guiding individualized resuscitation of ventricular fibrillation (VF) patients. However, accurate AMSA can only be calculated during cardiopulmonary resuscitation (CPR) pause due to artifacts produced by chest compression (CC). In this study, we developed a real-time AMSA estimation algorithm using a convolutional neural network (CNN). Methods: Data were collected from 698 patients, and the AMSA calculated from the uncorrupted signals served as the true value for both uncorrupted and the adjacent corrupted signals. An architecture consisting of a 6-layer 1D CNN and 3 fully connected layers was developed for AMSA estimation. A 5-fold cross-validation procedure was used to train, validate and optimize the algorithm. An independent testing set comprised of simulated data, real-life CC corrupted data, and preshock data was used to evaluate the performance. Results: The mean absolute error, root mean square error, percentage root mean square difference and correlation coefficient were 2.182/1.951 mVHz, 2.957/2.574 mVHz, 22.887/28.649% and 0.804/0.888 for simulated and real-life testing data, respectively. The area under the receiver operating characteristic curve regarding predicting defibrillation success was 0.835, which was comparable to that of 0.849 using the true value of the AMSA. Conclusions: AMSA can be accurately estimated during uninterrupted CPR using the proposed method.

3. Resuscitation. 2023 May 11:109826. doi: 10.1016/j.resuscitation.2023.109826. Online ahead of print.
Electrocardiographic Characteristics Fail to Predict Acute Coronary Occlusions in Out-of-Hospital Cardiac-Arrest Patients Without ST-Segment Elevation.
Leeper B(1), Kern KB(2), Liu S(3), Sun X(3).
ABSTRACT
BACKGROUND: A minority of out-of-hospital cardiac arrest patients have an acutely occluded coronary artery without manifesting ST-segment elevation on their post-resuscitation ECG. Identifying such patients is an issue to providing timely reperfusion therapy. We aimed to evaluate the usefulness of the initial post-resuscitation electrocardiogram in out-of-hospital-cardiac-arrest patients for selection to perform early coronary angiography. METHODS: The study population consisted of 74 of the 99 randomized patients from the PEARL clinical trial with both ECG and angiographic data. The purpose of this study was to investigate initial post-resuscitation electrocardiogram findings from out-of-hospital cardiac arrest patients without ST-segment elevation for any association with the presence of acute coronary occlusions. Secondarily, we aimed to observe the distribution of abnormal electrocardiogram findings and survival to hospital discharge of subjects. RESULTS: Initial post-resuscitation electrocardiogram findings, including ST-depression, T-wave inversion, bundle branch block, non-specific changes, were not associated with the presence

of an acutely occluded coronary. Normal post-resuscitation electrocardiogram findings were associated with patient survival to hospital discharge but were not associated with the presence or absence of an acute coronary occlusion. CONCLUSIONS: Electrocardiogram findings cannot exclude or identify the presence of an acutely occluded coronary in out-of-hospital-cardiac-arrest patients without ST-segment elevation. An acutely occluded coronary may be present regardless of normal electrocardiogram findings.

4. Prehosp Emerg Care. 2023 May 12:1-14. doi: 10.1080/10903127.2023.2212039. Online ahead of print.

Association between Conversion to Shockable Rhythms and Survival with Favorable Neurological Outcomes for Out-of-Hospital Cardiac Arrests.

Ho AFW(1)(2), Kai Yi L(3), Shahidah N(1), Fook-Chong S(4), Pek PP(2), Tanaka H(5)(6), Shin SD(7)(8), Ko PC(9), Yong-Qiang Tan B(10), Lim SL(11), Ma MH(12), Ryoo HW(13), Lin CH(14), Kuo CW(15), Kajino K(16), Ong MEH(1)(17).

ABSTRACT

Background The initial cardiac rhythm in out-of-hospital cardiac arrest (OHCA) portends different prognoses and affects treatment decisions. Initial shockable rhythms are associated with good survival and neurological outcomes but there is conflicting evidence for those who initially present with non-shockable rhythms. The aim of this study is to evaluate if OHCA with conversion from non-shockable (i.e., asystole and pulseless electrical activity) rhythms to shockable rhythms compared to OHCA remaining in non-shockable rhythms is associated with better survival and neurological outcomes. Method OHCA cases from the Pan-Asian Resuscitation Outcomes Study registry in 13 countries between January 2009 and February 2018 were retrospectively analyzed. Cases with missing initial rhythms, age <18 years, presumed non-medical cause of arrest, and not conveyed by emergency medical services were excluded. Multivariable logistic regression analysis was performed to evaluate the relationship between initial and subsequent shockable rhythm, survival to discharge, and survival with favorable neurological outcomes (cerebral performance category 1 or 2). Results Of the 116,387 cases included. 11,153 (9.6%) had initial shockable rhythms and 9,765 (8.4%) subsequently converted to shockable rhythms. Japan had the lowest proportion of OHCA patients with initial shockable rhythms (7.3%). For OHCA with initial shockable rhythm, the adjusted odds ratios (aOR) for survival and good neurological outcomes were 8.11 (95% confidence interval [CI] 7.62-8.63) and 15.4 (95%CI 14.1-16.8) respectively. For OHCA that converted from initial non-shockable to shockable rhythms, the aORs for survival and good neurological outcomes were 1.23 (95%CI 1.10-1.37) and 1.61 (95%CI 1.35-1.91) respectively. The aORs for survival and good neurological outcomes were 1.48 (95%CI 1.22-1.79) and 1.92 (95%CI 1.3 -2.84) respectively for initial asystole, while the aOR for survival in initial pulseless electrical activity patients was 0.83 (95%CI 0.71-0.98). Prehospital adrenaline administration had the highest aOR (2.05, 95%CI 1.93-2.18) for conversion to shockable rhythm.ConclusionIn this ambidirectional cohort study, conversion from non-shockable to shockable rhythm was associated with improved survival and neurologic outcomes compared to rhythms that continued to be non-shockable. Continued advanced resuscitation may be beneficial for OHCA with subsequent conversion to shockable rhythms.

5. Resuscitation. 2023 May 8:109817. doi: 10.1016/j.resuscitation.2023.109817. Online ahead of print.

EEG in a four-electrode frontotemporal montage reliably predicts outcome after cardiac arrest.

Admiraal MM(1), van Merkerk M(2), Horn J(3), Koelman JHTM(2), Hofmeijer J(4), Hoedemaekers CW(5), van Rootselaar AF(2).

ABSTRACT

AIM: To increase efficiency of continuous EEG monitoring for prognostication of neurological outcome in patients after cardiac arrest, we investigated the reliability of EEG in a four-electrode frontotemporal (4-FT) montage, compared to our standard nine-electrode (9-EL) montage. METHODS: EEG recorded with Ag/AgCl cup-electrodes at 12 and/or 24h after cardiac arrest of 153 patients was available from a previous study. 220 EEG epochs of 5 minutes were reexamined in a 4-FT montage according to the ACNS criteria. Background classification was compared to the available 9-EL classification using Cohens kappa. Reliability for prognostication was assessed in 151 EEG epochs at 24h after CA using sensitivity and specificity for prediction of poor (cerebral performance categories (CPC) 3-5) and good (CPC 1-2) neurological outcome. RESULTS: Agreement for EEG background classification between the two montages was substantial with a kappa of 0.85 (95%-CI 0.81-0.90). Specificity for prediction of poor outcome was 100% (95%-CI 95-100) for both montages, sensitivity was 31% (95%-CI 21-43) for the 4-FT montage and 35% (95%-CI 24-47) for the 9-EL montage. Good outcome was predicted with 65% specificity (95%-CI 53-76) and 81% sensitivity (95%-CI 71-89) for the 4-FT montage, similar to the 9-EL montage. CONCLUSION: In this cohort, EEG background patterns determined in a four-electrode frontotemporal montage predict both poor and good outcome after CA with similar reliability. Our results may contribute to decreasing the workload of EEG monitoring in patients after CA without compromising reliability of outcome prediction. However, validation in a larger cohort is necessary, as is a multimodal approach.

PEDIATRICS AND CHILDREN

1. Pediatr Crit Care Med. 2023 May 1;24(5):e244-e252. doi: 10.1097/PCC.0000000000003206. Epub 2023 Feb 8.

Association of Prehospital Physician Presence During Pediatric Out-of-Hospital Cardiac Arrest With Neurologic Outcomes.

Obara T(1), Yumoto T(1), Nojima T(1), Hongo T(1), Tsukahara K(1), Matsumoto N(2), Yorifuji T(2), Nakao A(1), Elmer J(3)(4)(5), Naito H(1).

ABSTRACT

OBJECTIVES: To examine the association of prehospital physician presence with neurologic outcomes of pediatric patients with out-of-hospital cardiac arrest (OHCA). DESIGN: Retrospective cohort study. SETTING: Data from the Japanese Association for Acute Medicine-OHCA Registry. INTERVENTIONS: None. PATIENTS: Pediatric patients (age 17 yr old or younger) registered in the database between June 2014 and December 2019. MEASUREMENT AND MAIN RESULTS: We used logistic regression models with stabilized inverse probability of treatment weighting (IPTW) to estimate the associated treatment effect of a prehospital physician with 1-month neurologically intact survival. Secondary outcomes included in-hospital return of spontaneous circulation (ROSC) and 1-month survival after OHCA. A total of 1,187 patients (276 in the physician presence group and 911 in the physician absence group) were included (median age 3 yr [interquartile range 0-14 yr]; 723 [61%] male). Comparison of the physician presence group, versus the physician absence, showed 1-month favorable neurologic outcomes of 8.3% (23/276) versus 3.6% (33/911). Physician presence was associated with greater odds of 1-month neurologically intact survival after stabilized IPTW adjustment (adjusted odds ratio [aOR] 1.98, 95% CI 1.08-3.66). We also found an association in the secondary outcome between physician presence, opposed to absence, and in-hospital ROSC (aOR 1.48, 95% CI 1.08-2.04). However, we failed to identify an association with 1-month survival (aOR 1.49, 95% CI 0.97-2.88). CONCLUSIONS: Among pediatric patients with OHCA, prehospital physician presence, compared with absence, was associated almost two-fold greater odds of 1-month favorable neurologic outcomes.

2. Biol Direct. 2023 May 10;18(1):24. doi: 10.1186/s13062-023-00379-5.

Combined treatment of nerve growth factor and transcranical direct current stimulations to improve outcome in children with vegetative state after out-of-hospital cardiac arrest.

Curatola A(1), Graglia B(2), Granata G(3), Conti G(4), Capossela L(2), Manni L(5), Ferretti S(2), Di Giuda D(6), Romeo DM(7), Calcagni ML(6), Soligo M(5), Castelli E(8), Piastra M(4), Mantelli F(9), Marca GD(10), Staccioli S(8), Romeo T(9), Pani M(11), Cocciolillo F(12), Mancino A(4), Gatto A(1), Chiaretti A(13)(14).

ABSTRACT

BACKGROUND: Out-of-hospital cardiac arrest (OHCA) is one of the most dramatic events in pediatric age and, despite advanced neurointensive care, the survival rate remains low. Currently, no effective treatments can restore neuronal loss or produce significant improvement in these patients. Nerve Growth Factor (NGF) is a neurotrophin potentially able to counteract many of the deleterious effects triggered by OHCA. Transcranial Direct Current Stimulation (tDCS) has been reported to be neuroprotective in many neurological diseases, such as motor deficit and cognitive impairment. Children with the diagnosis of chronic vegetative state after OHCA were enrolled. These patients underwent a combined treatment of intranasal administration of human recombinant NGF (hr-NGF), at a total dose of 50 gamma/kg, and tDCS, in which current intensity was increased from zero to 2 mA from the first 5 s of stimulation and maintained constant for 20 min. The treatment schedule was performed twice, at one month distance each. Neuroradiogical evaluation with Positron Emission Tomography scan (PET), Single Photon Emission Computed Tomography (SPECT), Electroencephalography (EEG) and Power Spectral Density of the brain (PSD) was determined before the treatment and one month after the end. Neurological assessment was deepened by using modified Ashworth Scale, Gross Motor Function Measure, and Disability Rating Scale. RESULTS: Three children with a chronic vegetative state secondary to OHCA were treated. The combined treatment with hr-NGF and tDCS improved functional (PET and SPECT) and electrophysiological (EEG and PSD) assessment. Also clinical conditions improved, mainly for the reduction of spasticity and with the acquisition of voluntary finger movements, improved facial mimicry and reaction to painful stimuli. No side effects were reported. CONCLUSIONS: These promising preliminary results and the ease of administration of this treatment make it worthwhile to be investigated further, mainly in the early stages from OHCA and in patients with better baseline neurological conditions, in order to explore more thoroughly the benefits of this new approach on neuronal function recovery after OHCA.

EXTRACORPOREAL LIFE SUPPORT

1. Eur Heart J Acute Cardiovasc Care. 2023 May 12:zuad052. doi: 10.1093/ehjacc/zuad052. Online ahead of print.

Pulmonary embolism related refractory out-of-hospital cardiac arrest and extracorporeal cardiopulmonary resuscitation: Prague OHCA study post-hoc analysis.

Pudil J(1), Rob D(1), Smalcova J(1)(2), Smid O(1), Huptych M(3), Vesela M(1), Kovarnik T(1), Belohlavek J(1).

ABSTRACT

BACKGROUND: Refractory out-of-hospital cardiac arrest (r-OHCA) in patients with pulmonary embolism (PE) is associated with poor outcomes. The role of extracorporeal cardiopulmonary resuscitation (ECPR) in this patient group is uncertain. This study aims to analyze clinical course, outcomes, and the effect of an invasive procedure, including ECPR, in a randomized population. METHODS: A post-hoc analysis of a randomized controlled trial (Prague OHCA study) was conducted to evaluate the effect of ECPR vs. a standard approach in r-OHCA. A subgroup of patients with PE-

related r-OHCA was identified, and procedural and outcome characteristics, including favorable neurological survival, organ donation, and complications, were compared to patients without PE. RESULTS: PE was identified as a cause of r-OHCA in 24 of 256 (9.4%) enrolled patients. Patients with PE were more likely to be women (12/24 [50%] vs. 32/232 [13.8%]; p < 0.001) and presented more frequently with an initial non-shockable rhythm (23/24 [95.8%] vs. 77/232 [33.2%]; p < 0.001), as well as more severe acidosis at admission (median pH [interquartile range]; 6.83 [6.75-6.88] vs. 6.98 [6.82-7.14]; p < 0.001). Their favorable 180 - days neurological survival was significantly lower (2/24 [8.3%] vs. 66/232 [28.4%]; P = 0.049), but the proportion of accepted organ donors was higher (16.7 vs. 4.7%, p = 0.04). CONCLUSION: r-OHCA due to PE has a different presentation and inferior outcomes compared to other causes but may represent an important source of organ donations. The ECPR method did not improve patient outcomes.

2. Resuscitation. 2023 May 11:109825. doi: 10.1016/j.resuscitation.2023.109825. Online ahead of print.

What is the potential benefit of pre-hospital extracorporeal cardiopulmonary resuscitation for patients with an out-of-hospital cardiac arrest? A predictive modelling study.

Vos IA(1), Deuring E(1), Kwant M(2), Bens BWJ(1), Dercksen B(3), Postma R(4), Jorna EMF(5), Struys MMRF(6), Ter Maaten JC(7), Singer B(8), Ter Avest E(9).

ABSTRACT

AIM: In this predictive modelling study we aimed to investigate how many patients with an out-of-hospital cardiac arrest (OHCA) would benefit from pre-hospital as opposed to in-hospital initiation of extracorporeal cardiopulmonary resuscitation (ECPR). METHODS: A temporal spatial analysis of Utstein data was performed for all adult patients with a non-traumatic OHCA attended by three emergency medical services (EMS) covering the north of the Netherlands during a one-year period. Patients were considered potentially eligible for ECPR if they had a witnessed arrest with immediate bystander CPR, an initial shockable rhythm (or signs of life during resuscitation) and could be presented in an ECPR-centre within 45 minutes of the arrest. Endpoint of interest was defined as the hypothetical number of ECPR eligible patients after 10, 15 and 20 minutes of conventional CPR and upon (hypothetical) arrival in an ECPR-centre as a fraction of the total number of OHCA patients attended by EMS. RESULTS: During the study period 622 OHCA patients were attended, of which 200 (32%) met ECPR eligibility criteria upon EMS arrival. The optimal transition point between conventional CPR and ECPR was found to be after 15 minutes. Hypothetical intra-arrest transport of all patients in whom no return of spontaneous circulation (ROSC) was obtained after that point (n=84) would have yielded 16/622 (2.5%) patients being potentially ECPR eligible upon hospital arrival (average low-flow time 52 minutes), whereas on-scene initiation of ECPR would have resulted in 84/622 (13.5%) potential candidates (average estimated low-flow time 24 minutes before cannulation). CONCLUSION: Even in healthcare systems with relatively short transport distances to hospital, consideration should be given to pre-hospital initiation of ECPR for OHCA as it shortens low-flow time and increases the number of potentially eligible patients.

3. ASAIO J. 2023 May 9. doi: 10.1097/MAT.0000000000001982. Online ahead of print.

Evaluation of Vasoactive-Inotropic Score and Survival to Decannulation in Adult Patients on Venoarterial Extracorporeal Life Support: An Observational Cohort Study.

Dunton K(1)(2), Weeks PA(1), Gulbis B(1), Jumean M(3), Kumar S(3), Janowiak L(3), Banjac I(3), Radovancevic R(3), Gregoric I(3), Kar B(3).

ABSTRACT

Extracorporeal life support with venoarterial extracorporeal membrane oxygenation (VA-ECMO) is used to assist circulation in patients with severe cardiogenic shock or cardiac arrest. The vasoactive-inotropic score (VIS) is a standardized calculation of vasoactive medication support which uses coefficients for each medication that converts them to an equivalent value. The purpose of this study was to assess the VIS as an early prognostication tool for survival to decannulation patients on

adult VA-ECMO support. This was a single-center, observational cohort study of adult patients who received VA-ECMO support compared based on their survival to decannulation. The primary endpoint was the VIS at hour 24 postcannulation. Among the 265 patients included in this study, 140 patients (52.8%) survived to decannulation of VA-ECMO. At 24 hours postcannulation, a lower VIS was observed in the group that survived decannulation (6.5 ± 7.5 vs. 12.3 ± 16.9; $p < 0.001$). Multivariate analysis performed also demonstrates an association between 24-hour VIS and survival to decannulation (odds ratio 0.95; 95% confidence interval, 0.91-0.95). This study suggests that the 24-hour VIS may be an early prognostic indicator in patients on VA-ECMO patients.

4. Artif Organs. 2023 May;47(5):802-805. doi: 10.1111/aor.14520.
Extracorporeal CPR after the INCEPTION trial: No one steps twice into the same river.
Scquizzato T(1), Yannopoulos D(2), Bělohlávek J(3), Taccone FS(4), Lorusso R(5), Scandroglio AM(1), Landoni G(1)(6), Swol J(7).
ABSTRACT
The use of veno-arterial extracorporeal membrane oxygenation as extracorporeal cardiopulmonary resuscitation in patients suffering out-of-hospital cardiac arrest, largely increased in the last decade despite evidence supporting this practice being limited to non-randomized studies. However, between 2020 and 2023, four randomized studies were published comparing extracorporeal cardiopulmonary resuscitation to conventional cardiopulmonary resuscitation with controversial findings that triggered great debates. In this controversy, we discuss merits and pitfalls, and provide a critical interpretation of the available evidence from randomized trials on the use of extracorporeal cardiopulmonary resuscitation, with a particular focus on the recent multi-center INCEPTION trial.

EXPERIMENTAL RESEARCH

No articles identified.

CASE REPORTS

1. Respirol Case Rep. 2023 May 8;11(6):e01069. doi: 10.1002/rcr2.1069. eCollection 2023 Jun.
Massive pulmonary embolism led to cardiac arrest two days after thoracoscopy in a young male with pleural tuberculosis.
Kanjo W(1), Abbarh S(1), Bougaila A(1), Sadik N(1), Habib MB(1).
ABSTRACT
TB itself is considered an independent risk factor for VTE; however, developing pulmonary embolism after medical thoracoscopy is extremely rare. Herein, we describe a 30-year-old previously healthy male with pleural tuberculosis developed a massive pulmonary embolism with subsequent cardiac arrest after a diagnostic medical thoracoscopy. Computed tomography pulmonary angiogram (CTPA) showed major right pulmonary embolism (PE). Unfortunately, the patient passed away despite resuscitation and extensive organ support in the intensive care unit (ICU). This case highlights the thrombotic risk in this population group in order to avoid such devastating complications.

2. Cureus. 2023 Apr 7;15(4):e37262. doi: 10.7759/cureus.37262. eCollection 2023 Apr.
Lung Herniation as a Result of Cardiopulmonary Resuscitation (CPR): A Case Report and Literature Review.
Fuller P(1), Almafreji I(2), Cole S(2).
ABSTRACT
Lung herniation is a rare complication following cardiopulmonary resuscitation (CPR) and is defined as a protrusion of lung parenchyma through the thoracic wall. This article presents a case in which a

patient presented to the hospital with sepsis secondary to community-acquired pneumonia. A 74-year-old female with a background of chronic obstructive pulmonary disease (COPD) suffered a sudden pulseless electrical activity (PEA) cardiac arrest while being managed in the acute medical ward. The CT following the return of spontaneous circulation (ROSC) demonstrated multiple bilateral anterior rib fractures and herniation of the right lung through the right lateral thoracic wall. She was managed in the ICU with ventilatory and cardiovascular support for four days until she suffered a second cardiac arrest, where resuscitation was unsuccessful. In addition to this case report, a literature review was carried out, given the rarity of this pathology. The literature provides only 13 articles on lung herniation due to CPR. The most common injury pattern was anterior rib fractures leading to anterior lung herniation. In our case report, the herniation was away from the fracture site at the lateral chest wall. A common complication was surgical emphysema in several of the articles, as was in our case. The surgical intervention appears to be indicated in large hernias, incarceration, or those causing pain and respiratory compromise. In our case, conservative management was elected, given the patient's significant persistent cardiovascular instability unsuitable for interhospital transfer. A high index of suspicion should be adopted for patients who undergo a prolonged period of CPR, including frail patients with underlying health conditions such as chronic lung disease.

3. Exp Ther Med. 2023 Apr 13;25(6):250. doi: 10.3892/etm.2023.11949. eCollection 2023 Jun.
Extracorporeal membrane oxygenation combined with minimally invasive surgery for acute respiratory failure and sudden cardiac arrest: A case report.
Guo DW(1), Gao J(1), Wu HL(2), Wu C(3), Wu JX(4), Rui Q(4), Bao Y(5), Liu ZH(1), Wang XY(1), Xu LD(1), Hu X(1), Zhang J(1).
ABSTRACT
Acute respiratory failure and sudden cardiac arrest caused by acute intrathoracic infection is a fatal clinical condition with a low resuscitation success rate. The present study describes the case of a patient with acute empyema secondary to an acute lung abscess rupture, complicated by acute respiratory failure and sudden cardiac arrest caused by severe hypoxemia. The patient recovered well through the administration of multiple therapeutic measures, including medication and closed chest drainage, cardiopulmonary resuscitation, extracorporeal membrane oxygenation combined with continuous renal replacement therapy, and minimally invasive surgical resection of the lung lesion with persistent alveolar fistula as the clinical manifestation. To the best of our knowledge, the treatment of such a severe condition combined with thoracoscopic surgery has rarely been reported before, and the present study may provide insight regarding therapeutic schedules for acute respiratory failure by intrathoracic infection, and excision of ruptured lung abscess.

4. Cureus. 2023 Apr 7;15(4):e37263. doi: 10.7759/cureus.37263. eCollection 2023 Apr.
Acquired Long QT Syndrome: Ventricular Fibrillation in an Otherwise Healthy Young Female.
Ott WP(1), Bellamy SE(1), Khan M(1), Shahid A(1), Javed MT(2).
ABSTRACT
Long QT syndrome (LQTS) occurs when there is an abnormality of myocardial repolarization characterized specifically by a prolonged QT interval on an electrocardiogram (ECG). This can be particularly dangerous as it is associated with an increased risk of polymorphic ventricular tachycardia and a life-threatening arrhythmia otherwise known as torsades de pointes (TdP). We present a case of a 40-year-old Indian female whose medical history was significant only for anemia and depression/anxiety that presented in a ventricular fibrillation cardiac arrest after becoming dyspneic and light-headed while dancing. Of relevance, she was taking sertraline 50mg once daily, a class of medications known to prolong the QT interval as well as having low serum calcium on

presentation. Both her initial and subsequent electrocardiograms illuminated significantly prolonged QTc intervals. She subsequently sustained a ventricular tachycardia cardiac arrest, which degenerated into ventricular fibrillation in the cardiac intensive care unit two days later. Ultimately, the patient was pronounced brain-dead by the end of the week. We concluded this to be a case of LQTS predisposing to TdP, which then would degenerate into ventricular fibrillation. This case highlights multiple risk factors that are known to predispose to the aforementioned etiology. Further research is needed not only on common medications and their dose-dependent relationship on the QT interval across different ethnic groups but also on educating providers regarding multiple risk factors they may or may not have the power to control.

5. Cureus. 2023 Apr 5;15(4):e37158. doi: 10.7759/cureus.37158. eCollection 2023 Apr.
Cardiac Arrest Due to Brugada Syndrome Associated With Influenza Infection: A Case Report and Literature Review.
Ono R(1), Hori Y(1), Yamazaki T(1), Takahashi H(1), Fukushima K(1).
ABSTRACT
A 38-year-old Japanese male with no significant medical history but a family history of sudden cardiac death was referred for cardiac arrest. He had a fever (40°C) one day before his visit. His wife reported that he groaned while unconscious, which prompted a referral to the authors' hospital. He was febrile and experienced ventricular fibrillation in the emergency department. After the resolution of ventricular fibrillation, electrocardiography revealed a right bundle branch block with ST-segment elevation in leads V1-3, consistent with a Brugada electrocardiographic pattern; he also tested positive for influenza A infection. Antiarrhythmic and antipyretic agents were administered, and peramivir was initiated; a fatal arrhythmia did not occur. A cardioverter-defibrillator was implanted, and the patient was discharged without complications. Brugada syndrome is a genetic disease that causes fatal cardiac arrhythmias, with fever recognized to induce the Brugada electrocardiographic pattern. The mechanism of the Brugada-type electrocardiographic pattern, right bundle branch block, and ST-segment elevation in the right precordial leads is considered to be the result of an outward shift of ionic currents during early repolarization, causing a marked abbreviation of the action potential in epicardial cells of the right ventricle. Activation and inactivation kinetics for early sodium currents are faster at higher temperatures. To date, there have only been four published reports describing Brugada-like electrocardiographic changes associated with fever related to influenza infection, and this is the first report of cardiac arrest. Since influenza infection can cause high fever and trigger the fetal arrhythmia of Brugada syndrome, it is important to shorten the duration of the fever. Anti-influenza therapy may be considered in patients who have a history of sudden cardiac arrest in the family, as influenza may influence the development of the Brugada ECG pattern in these individuals. The authors also review the literature on Brugada-like electrocardiographic changes induced by influenza infection. Physicians should be aware that Brugada's electrocardiographic pattern and cardiac arrest can be caused by febrile episodes, including those related to influenza infection.

6. Am J Case Rep. 2023 May 8;24:e939035. doi: 10.12659/AJCR.939035.
Anti-PL12 Anti-Synthetase Syndrome and Amyotrophic Lateral Sclerosis: A Case Report of a Rare Comorbidity.
Shamim EA(1)(2), Kong MW(1), Lim IY(3), McCarthy RJ(1), Grant SN(4), Nagi HK(5).
ABSTRACT
BACKGROUND Anti-PL-12 syndrome is a rare form of myositis. Amyotrophic lateral sclerosis (ALS) is the commonest of the motor neuron disorders. However, the 2 conditions have not been reported to occur together in a single individual. This case report describes a patient who was diagnosed with

anti-PL-12 anti-synthetase syndrome and then subsequently was diagnosed with ALS. CASE REPORT A 55-year-old male patient had anti-PL-12 syndrome and ALS occurring together. The patient initially presented with musculoskeletal complaints and was diagnosed with anti-PL-12 syndrome. He later went on to develop shortness of breath. Neurophysiological testing subsequently confirmed ALS as the patient experienced worsening muscle weakness over a 2-year period. A muscle biopsy performed showed neurogenic and myopathic process. The patient eventually lost the ability to ambulate without mobility assistance and suffered cardiac arrest due to complications from ALS, specifically diaphragmatic dysfunction. CONCLUSIONS This case report represents the first documented case of a patient having both anit-PL-12 syndrome and ALS together. It has been suggested that having an autoimmune disease (AID) may increase the subsequent risk of developing ALS. Previous studies did not conduct evaluation to ascertain serological markers for AS antibodies. Lab tests were rechecked and revalidated multiple times in separate facilities for confirmation of results in case of initial lab error. This may suggest a common etiology for both anti-PL-12 syndrome and ALS.