This week's PubMed 19th – 25th June 2022: articles of interest n = 43

CPR AND COVID-19

No articles identified.

CPR/MECHANICAL CHEST COMPRESSION

1. Resuscitation. 2022 Jun 20:S0300-9572(22)00579-2. doi: 10.1016/j.resuscitation.2022.06.014. Online ahead of print.

Mechanical chest compression devices under special circumstances.

Gässler H(1), Kurka L(2), Rauch S(2), Seewald S(3), Kulla M(4), Fischer M(2).

ABSTRACT

AIM: According to the current resuscitation guidelines, the use of mechanical chest compression devices could be considered under special circumstances like transport with ongoing resuscitation or long-term resuscitation. The aim of this study was to investigate whether survival is improved using mechanical devices under such circumstances. METHODS: Out-of-hospital cardiac arrests from all high-quality data centres of the German Resuscitation Registry from 2007-2020 were investigated. The use of mechanical devices was compared separately for transport with ongoing resuscitation, prolonged resuscitation (>45 minutes), and resuscitation with fibrinolytic agents applied. Baseline characteristics, 30-day survival/discharged alive, and neurological function at discharge were analysed descriptively; and 30-day survival/discharged alive was additionally analysed using multivariate logistic regression. RESULTS: Overall, patients who were treated with a mechanical device tended to be younger and were significantly more likely to have a witnessed cardiac arrest and a shockable initial rhythm. During the study period, 4,851 patients were transported to hospital with ongoing resuscitation (devices used in 44.2%). The 30-day survival was equal (odds ratio, OR: 1.13, 95%-CI: 0.79-1.60). In 3,920 cases, a resuscitation duration >45 min was documented (9.5% with device). When a device was used, 30-day survival was significantly increased (OR 2.33, 95%-CI: 1.30-4.15). Fibrinolytic agents were used in 2,106 patients (22.2% with device). Here, 30-day survival was significantly worse with a device (OR: 0.52, 95%-CI: 0.30-0.91). CONCLUSION: Mechanical devices are not associated with better survival when used during transport, but rescuer safety could still be an important argument for their use. Devices are associated with better survival in prolonged resuscitation, but worse survival when a fibrinolytic was used.

2. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue. 2022 May;34(5):542-544. doi: 10.3760/cma.j.cn121430-20211228-01943.

[Design and application of a portable cardiopulmonary resuscitation protection device].

[Article in Chinese]

Zhao S(1), Gu R(2), Li H(3), Chen K(4), Yang H(4), Yan X(1)(4).

ABSTRACT

Standardized cardiopulmonary resuscitation (CPR) of patients prior to the arrival of emergency medical services can significantly improve survival rate after out-of-hospital cardiac arrest (OHCA). According to statistics, about 40% to 85% of CPR led to chest fractures, making bystanders alarm, and reducing the willingness of rescuing by CPR. Therefore, there is an urgent need to develop a CPR protection device that is convenient for placing in public places outside the hospital and conforms to the operation habit of freehand CPR. In view of the above problems, medical students majored in

emergency and rescue medicine and anesthesiology in Xuzhou Medical University, together with students majored in product design in Southeast University, designed a portable CPR protection device under the guidance of doctors working in department of emergency medicine of the Affiliated Hospital of Xuzhou Medical University, and obtained the national invention patent authorization of China (patent number: ZL 2021 1 0309001.4) and the national utility model patent authorization of China (patent number: ZL 2021 2 0591084.6). The device is composed of a foldable frame, support components, guide slide rails and compression body, which provides guidance and guarantee for the implementation of CPR, thus users can accurately grasp the implementation process, compression amplitude, strength and frequency, and effectively prevent accidental injuries such as rib fractures caused by CPR compression. The device is small, easy to store and move, with low manufacturing cost, making it suitable for social popularization.

REGISTRIES, REVIEWS AND EDITORIALS

1. Clin Res Cardiol. 2022 Jun 21. doi: 10.1007/s00392-022-02044-9. Online ahead of print.
German Cardiac Arrest Registry: rationale and design of G-CAR.
Pöss J(#)(1), Sinning C(#)(2), Schreiner I(3), Apfelbacher C(4), Drewitz KP(4), Hösler N(5), Schneider S(6), Pieske B(7), Böttiger BW(8), Ewen S(9), Wienbergen H(10), Kelm M(11), Bock D(12), Graf T(13), Adler C(8), Dutzmann J(14), Knie W(15), Orban M(16), Zeymer U(6), Michels G(#)(17), Thiele H(#)(3); G-CAR Investigators.

ABSTRACT
BACKGROUND: In Germany, 70,000-100,000 persons per year suffer from out-of-hospital cardiac arrest (OHCA). Despite medical progress, survival rates with good neurological outcome remain low. For many important clinical issues, no or only insufficient evidence from randomised trials is available. Therefore, a systemic and standardised acquisition of the treatment course and of the outcome of OHCA patients is warranted. STUDY DESIGN: The German Cardiac Arrest Registry (G-CAR) is an observational, prospective, multicentre registry. It will determine the characteristics, initial treatment strategies, invasive procedures, revascularisation therapies and the use of mechanical circulatory support devices with a focus on extracorporeal cardiopulmonary resuscitation. A special feature is the prospective 12-month follow-up evaluating mortality, neurological outcomes and several patient-reported outcomes in the psychosocial domain (health-related quality of life, cognitive impairment, depression/anxiety, post-traumatic stress disorder and social reintegration). In a pilot phase of 24 months, 15 centres will include approximately 400 consecutive OHCA patients ≥ 18 years. Parallel to and after the pilot phase, scaling up of G-CAR to a national level is envisaged. CONCLUSION: G-CAR is the first national registry including a long-term follow-up for adult OHCA patients. Primary aim is a better understanding of the determinants of acute and long-term outcomes with the perspective of an optimised treatment.

2. Front Aging Neurosci. 2022 May 26;14:885226. doi: 10.3389/fnagi.2022.885226. eCollection 2022.
Long Term Cognitive Function After Cardiac Arrest: A Mini-Review.
Hagberg G(1)(2), Ihle-Hansen H(1)(3), Sandset EC(2), Jacobsen D(4), Wimmer H(4), Ihle-Hansen H(1)(2).

ABSTRACT
Out-of-hospital cardiac arrest (OHCA) is a leading cause of mortality worldwide. With better pre- and inhospital treatment, including cardiopulmonary resuscitation (CPR) as an integrated part of public education and more public-access defibrillators available, OHCA survival has increased over the last decade. There are concerns, after successful resuscitation, of cerebral hypoxia and degrees of potential acquired brain injury with resulting poor cognitive functioning. Cognitive function is not

routinely assessed in OHCA survivors, and there is a lack of consensus on screening methods for cognitive changes. This narrative mini-review, explores available evidence on hypoxic brain injury and long-term cognitive function in cardiac arrest survivors and highlights remaining knowledge deficits.

3. Eur Heart J Acute Cardiovasc Care. 2022 Jun 22;11(6):470-480. doi: 10.1093/ehjacc/zuac048.
Eligibility of extracorporeal cardiopulmonary resuscitation on in-hospital cardiac arrests in Sweden: a national registry study.
Ölander CH(1), Vikholm P(1), Schiller P(1), Hellgren L(1).
ABSTRACT
AIMS: Extracorporeal cardiopulmonary resuscitation (ECPR) for refractory cardiac arrest (CA) is used in selected cases. The incidence of ECPR-eligible patients is not known. The aim of this study was to identify the ECPR-eligible patients among in-hospital CAs (IHCA) in Sweden and to estimate the potential gain in survival and neurological outcome, if ECPR was to be used. METHODS AND RESULTS: Data between 1 January 2015 and 30 August 2019 were extracted from the Swedish Cardiac Arrest Register (SCAR). Two arbitrary groups were defined, based on restrictive or liberal inclusion criteria. In both groups, logistic regression was used to determine survival and cerebral performance category (CPC) for conventional cardiopulmonary resuscitation (cCPR). When ECPR was assumed to be possible, it was considered equivalent to return of spontaneous circulation, and the previous logistic regression model was applied to define outcome for comparison of conventional CPR and ECPR. The assumption in the model was a minimum of 15 min of refractory CA and 5 min of cannulation. A total of 9209 witnessed IHCA was extracted from SCAR. Depending on strictness of inclusion, an average of 32-64 patients/year remains in refractory after 20 min of cCPR, theoretically eligible for ECPR. If optimal conditions for ECPR are assumed and potential negative side effects disregarded of, the estimated potential benefit of survival of ECPR in Sweden would be 10-19 (0.09-0.19/100 000) patients/year, when a 30% success rate is expected. The benefit of ECPR on survival and CPC scoring was found to be detrimental over time and minimal at 60 min of cCPR. CONCLUSION: The number of ECPR-eligible patients among IHCA in Sweden is dependent on selection criteria and predicted to be low. There is an estimated potential benefit of ECPR, on survival and neurological outcome if initiated within 60 min of the IHCA.

4. Emerg Med J. 2022 Jul;39(7):547-553. doi: 10.1136/emermed-2020-211073. Epub 2021 Jun 2.
Rationale, development and implementation of the ReACanROC registry for out-of-hospital cardiac arrests in France and Canada.
Heidet M(1)(2)(3), Hubert H(4)(5), Grunau BE(6)(7)(8)(9), Cheskes S(10)(11), Baert V(4)(5), Fraticelli L(12)(13), Freyssenge J(12)(14), Lecarpentier E(15), Stitt A(11), Tallon JM(6)(9), Tazarourte K(14)(16), Truong C(11), Vaillancourt C(17)(18), Vilhelm C(5), Wysocki K(11), Christenson J(6)(7)(8), El Khoury C(12)(14)(19); Gr-ReAC and CanROC investigators.
ABSTRACT
France and Canada prehospital systems and care delivery in out-of-hospital cardiac arrests (OHCAs) show substantial differences. This article aims to describe the rationale, design, implementation and expected research implications of the international, population-based, France-Canada registry for OHCAs, namely ReACanROC, which is built from the merging of two nation-wide, population-based, Utstein-style prospectively implemented registries for OHCAs attended to by emergency medical services. Under the supervision of an international steering committee and research network, the ReACanROC dataset will be used to run in-depth analyses on the differences in organisational, practical and geographic predictors of survival after OHCA between France and Canada. ReACanROC is the first Europe-North America registry ever created to meet this goal. To date, it covers close to

80 million people over the two countries, and includes approximately 200 000 cases over a 10-year period.

5. Resuscitation. 2022 Jun 18:S0300-9572(22)00574-3. doi: 10.1016/j.resuscitation.2022.06.011. Online ahead of print.

Association between sex and survival after non-traumatic out of hospital cardiac arrest: A systematic review and meta-analysis.

Malik A(1), Gewarges M(2), Pezzutti O(1), Allan KS(2), Samman A(1), Akioyamen LE(1), Ruiz M(2), Brijmohan A(3), Basuita M(1), Tanaka D(1), Scales D(4), Luk A(5), Lawler P(5), Kalra S(5), Dorian P(6).

ABSTRACT

BACKGROUND: Existing studies have shown conflicting results regarding the relationship of sex with survival after out of hospital cardiac arrest (OHCA). This systematic review evaluates the association of female sex with survival to discharge and survival to 30 days after non-traumatic OHCA. METHODS: We searched Medline, Embase, CINAHL, Web of Science, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews from inception through June 2021 for studies evaluating female sex as a predictor of survival in adult patients with non-traumatic cardiac arrest. Random-effects inverse variance meta-analyses were performed to calculate pooled odds ratios (ORs) with 95% confidence intervals (CI). The GRADE approach was used to assess evidence quality. RESULTS: Thirty studies including 1,068,788 patients had female proportion of 41%. There was no association for female sex with survival to discharge (OR 1.03, 95% CI 0.95-1.12; I2=89%). Subgroup analysis of low risk of bias studies demonstrated increased survival to discharge for female sex (OR 1.20, 95% CI 1.18-1.23; I2=0%) and with high certainty, the absolute increase in survival was 2.2% (95% CI 0.1%-3.6%). Female sex was not associated with survival to 30 days post-OHCA (OR 1.02, 95% CI 0.92-1.14; I2=79%). CONCLUSIONS: In adult patients experiencing OHCA, with high certainty in the evidence from studies with low risk of bias, female sex had a small absolute difference for the outcome survival to discharge and no difference in survival at 30 days. Future models that aim to stratify risk of survival post-OHCA should focus on sex-specific factors as opposed to sex as an isolated prognostic factor.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2022 Jun 17:S0300-9572(22)00570-6. doi: 10.1016/j.resuscitation.2022.06.008. Online ahead of print.

Outcomes of In-Hospital Cardiac Arrest Among Hospitals With and Without Telemedicine Critical Care.

Ofoma UR(1), Drewry AM(2), Maddox TM(3), Boyle W(2), Deych E(4), Kollef M(5), Girotra S(6), Joynt Maddox KE(4); American Heart Association's Get With The Guidelines®- Resuscitation Investigators.

ABSTRACT

BACKGROUND: Survival rates following in-hospital cardiac arrest (IHCA) are lower during nights and weekends (off-hours), as compared to daytime on weekdays (on-hours). Telemedicine Critical Care (TCC) may provide clinical support to improve IHCA outcomes, particularly during off-hours. OBJECTIVE: To evaluate the association between hospital availability of TCC and IHCA survival. METHODS: We identified 44,585 adults at 280 U.S. hospitals in the Get With The Guidelines® - Resuscitation registry who suffered IHCA in an Intensive Care Unit (ICU) or hospital ward between July 2017 and December 2019. We used 2-level hierarchical multivariable logistic regression to investigate whether TCC availability was associated with better survival, overall, and during on-hours (Monday-Friday 7:00 a.m.-10:59 p.m.) vs. off-hours (Monday-Friday 11:00 p.m.-6:59 a.m., and Saturday-Sunday, all day, and US national holidays). RESULTS: 14,373 (32.2%) participants suffered IHCA at hospitals with TCC, and 27,032 (60.6%) occurred in an ICU. There was no difference between

TCC and non-TCC hospitals in acute resuscitation survival rate or survival to discharge rates for either IHCA occurring in the ICU (acute survival odds ratio [OR] 1.02, 95% CI 0.92-1.15; survival to discharge OR 0.94 [0.83-1.07]) or outside of the ICU (acute survival OR 1.03 [0.91-1.17]; survival to discharge OR 0.99 [0.86-1.12]. Timing of cardiac arrest did not modify the association between TCC availability and acute resuscitation survival (P = .37 for interaction) or survival to discharge (P = .39 for interaction). CONCLUSIONS: Hospital availability of TCC was not associated with improved outcomes for in-hospital cardiac arrest.

2. Aust Crit Care. 2022 Jul;35(4):424-429. doi: 10.1016/j.aucc.2021.07.002. Epub 2021 Aug 26.
Functional outcomes following an in-hospital cardiac arrest: A retrospective cohort study.
Doherty ZB(1), Fletcher JA(2), Fuzzard KL(2), Leach MJ(3), O'Sullivan BG(4), Panozzo LE(5), Pound GM(6), Saka E(7), Kippen RJ(8).

ABSTRACT
BACKGROUND/PURPOSE: Whilst much is known about the survival outcomes of patients that suffer an in-hospital cardiac arrest (IHCA) in Australia very little is known about the functional outcomes of survivors. This study aimed to describe the functional outcomes of a cohort of patients that suffered an in-hospital cardiac arrest (IHCA) and survived to hospital discharge in a regional Australian hospital. METHODS: This is a single-centre retrospective observational cohort study conducted in a regional Australian hospital. All adult patients that had an IHCA in the study hospital between 1 Jan 2017 and 31 Dec 2019 and survived to hospital discharge were included in the study. Functional outcomes were reported using the Modified Rankin Scale (mRS), a six-point scale for which increasing scores represent increasing disability. Scores were assigned through a retrospective review of medical notes. RESULTS: Overall, 102 adult patients had an IHCA during the study period, of whom 50 survived to hospital discharge. The median age of survivors was 68 years, and a third had a shockable initial arrest rhythm. Of survivors, 47 were able to be assigned both mRS scores. At discharge, 81% of patients achieved a favourable functional outcome (mRS 0-3 or equivalent function at discharge equal to admission). CONCLUSIONS: Most survivors to hospital discharge following an IHCA have a favourable functional outcome and are discharged home. Although these results are promising, larger studies across multiple hospitals are required to further inform what is known about functional outcomes in Australian IHCA survivors.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. JACC Clin Electrophysiol. 2022 Jun;8(6):806-821. doi: 10.1016/j.jacep.2021.12.014.
Latent Causes of Sudden Cardiac Arrest.
Krahn AD(1), Tfelt-Hansen J(2), Tadros R(3), Steinberg C(4), Semsarian C(5), Han HC(6).

ABSTRACT
Inherited arrhythmia syndromes are a common cause of apparently unexplained cardiac arrest or sudden cardiac death. These include long QT syndrome and Brugada syndrome, with a well-recognized phenotype in most patients with sufficiently severe disease to lead to cardiac arrest. Less common and typically less apparent conditions that may not be readily evident include catecholaminergic polymorphic ventricular tachycardia, short QT syndrome and early repolarization syndrome. In cardiac arrest patients whose extensive testing does not reveal an underlying etiology, a diagnosis of idiopathic ventricular fibrillation or short-coupled ventricular fibrillation is assigned.

This review summarizes our current understanding of the less common inherited arrhythmia syndromes and provides clinicians with a practical approach to diagnosis and management.

2. Forensic Sci Int Genet. 2022 Jul;59:102723. doi: 10.1016/j.fsigen.2022.102723. Epub 2022 May 16.
Post-mortem toxicology analysis in a young sudden cardiac death cohort.
Coll M(1), Fernàndez-Falgueras A(2), Tiron C(2), Iglesias A(3), Buxó M(4), Simón A(3), Nogué-Navarro L(5), Moral S(6), Pérez-Serra A(3), Puigmulé M(7), Del Olmo B(3), Campuzano O(8), Castellà J(9), Picó F(3), Lopez L(3), Neto N(3), Corona M(3), Alcalde M(3), Brugada R(10).
ABSTRACT
Risk of sudden cardiac death (SCD) increases with age, and several studies have examined the impact of different drugs on cardiovascular function. However, few studies have integrated epidemiological drug consumption data and genetic background in the context of cardiac death. We performed a retrospective population-based study in forensic sudden death cases from a 9-year period in Catalonia. The young cohort included 924 cases 18-50 years old, 566 of which had a cardiac cause of death. Complete autopsy, toxicological, and histopathological studies were performed. Molecular autopsy using next-generation sequencing was performed in nearly 400 cardiac cases. Cases related with fatal acute intoxication were excluded. Drug consumption prevalence was similar between forensic cases of cardiac and non-cardiac origin (62.5% versus 69.5%), with the exception of alcohol, which was more prevalent in the cardiac group than in the non-cardiac group (23.3% versus 17.1%). Individuals in the toxicology-positive group were carriers of more rare genetic variants and were significantly younger than the toxicology-negative group. Psychopharmacological drugs were identified in 22.3% of cardiac cases, and molecular autopsy identified an association between antiepileptic drugs or caffeine and pathogenic or likely pathogenic variants in arrhythmogenic genes. Specific substances could therefore play an essential role as triggers of SCD in genetically predisposed young people.

END-TIDAL CO_2

1. Resuscitation. 2022 Jun 21:S0300-9572(22)00578-0. doi: 10.1016/j.resuscitation.2022.06.013. Online ahead of print.
Association between Trajectories of End-tidal Carbon Dioxide and Return of Spontaneous Circulation among Emergency Department Patients with Out-of-hospital Cardiac Arrest.
Wang CH(1), Lu TC(1), Tay J(2), Wu CY(2), Wu MC(2), Chong KM(2), Chou EH(3), Tsai CL(4), Huang CH(1), Huei-Ming Ma M(5), Chen WJ(6).
ABSTRACT
BACKGROUND: We aimed to identify distinct trajectories of end-tidal carbon dioxide (EtCO2) during cardiopulmonary resuscitation in patients with out-of-hospital cardiac arrest (OHCA) and to investigate the association between EtCO2 trajectories and OHCA outcomes. METHODS: This was a secondary analysis of a prospectively collected database on adult patients with OHCA who had been resuscitated in the emergency department of a tertiary medical center between 2015 and 2020. The primary outcome was the return of spontaneous circulation (ROSC). Group-based trajectory modelling was used to identify the EtCO2 trajectories. Multivariable logistic regression analysis was performed to evaluate the association between EtCO2 trajectories and ROSC. The predictive performance of the EtCO2 trajectories was assessed using the area under the receiver operating characteristic curve (AUC). RESULTS: The study comprised 655 patients with OHCA. In the primary analysis, three distinct EtCO2 trajectories, including 10-mmHg, 30-mmHg, and 50-mmHg trajectories, were identified. Compared with the 10-mmHg trajectory, both 30-mmHg (odds ratio [OR]: 4.66, 95% confidence interval [CI]: 3.15-6.90) and 50-mmHg (OR: 7.58, 95% CI: 4.30-13.35) trajectories were

associated with a higher likelihood of ROSC. In a sensitivity analysis of excluding EtCO2 measured before tracheal intubation or after sodium bicarbonate administration, the predictive ability of the identified EtCO2 trajectories remained. As a single predictor of ROSC, EtCO2 trajectories had an acceptable discriminative performance (AUC: 0.69, 95% CI: 0.66-0.73). CONCLUSION: Three distinct EtCO2 trajectories during cardiopulmonary resuscitation were identified and significantly associated with outcomes. Early identification of these EtCO2 trajectories could potentially guide the ongoing resuscitation efforts.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

1. Ann Med Surg (Lond). 2022 May 20;78:103832. doi: 10.1016/j.amsu.2022.103832. eCollection 2022 Jun.

The effect of epinephrine and methylprednisolone on cardiac arrest patients.

Rafiei H(1)(2), Bahrami N(3), Meisami AH(1), Azadifar H(2), Tabrizi S(1).

ABSTRACT

BACKGROUND: Cardiopulmonary resuscitation (CPR) involves organized procedures performed on patients with cardiac arrest. CPR method and techniques can determine neurological outcomes of the patients. The aim of this study is to investigate the effect of epinephrine in combination with methylprednisolone on neurological complications and the need for vasopressor after resuscitation in patients with cardiac and respiratory arrest. METHODS: In this randomized control clinical trial, patients referred to (XXX) who suffered from cardiac arrest and required CPR were included. Patients were divided into two groups; intervention (methylprednisolone + epinephrine) and placebo (epinephrine + placebo). Patients' information was completed in a questionnaire based on demographic information, main objectives and important variables (neurological complication and the need for vasopressor) and SPSSv21 was used for statistical analysis. RESULTS: A total of 347 patients were included in the study. The intervention and control group were not significantly different in terms of gender, age systolic and diastolic blood pressure, $p > 0.05$. CPC scores were also not significantly different among the two groups, $p > 0.05$.131 patients (37.8%) needed vasopressor after the intervention and 216 patients (62.2%) did not need vasopressor. The two groups were significantly different in terms of intervention ($P = 0.021$). CONCLUSION: Glucocorticoid, methylprednisolone does not reduce the risk of neurological complications following CPR in cardiac arrest patients.

TRAUMA

1. J Clin Med. 2022 Jun 20;11(12):3564. doi: 10.3390/jcm11123564.

Association between Timing of Epinephrine Administration and Outcomes of Traumatic Out-of-Hospital Cardiac Arrest following Traffic Collisions.

Hosomi S(1)(2), Kitamura T(2), Sobue T(2), Zha L(2), Kiyohara K(3), Matsuyama T(4), Oda J(1).

ABSTRACT

The effects of epinephrine administration timing on patients with out-of-hospital cardiac arrest (OHCA) following traffic collisions are unknown. We analyzed the 2013-2019 All-Japan Utstein Registry data of 2024 such patients aged ≥18 years who were resuscitated by emergency medical service (EMS) personnel or bystanders and then transported to medical institutions. Time from 119 call to epinephrine administration was classified into quartiles: Q1 (6-21 min), Q2 (22-26 min), Q3 (27-34 min), and Q4 (35-60 min). Multivariable logistic regression analysis was used to assess the effects of epinephrine administration timing on one-month survival after OHCA. Overall, the one-month survival rates were 3.2% (15/466) in Q1, 1.1% (5/472) in Q2, 1.9% (11/577) in Q3, and 0.2% (1/509) in Q4. Additionally, the one-month survival rate decreased significantly in the Q4 group (adjusted odds ratio, 0.07; 95% confidence interval, 0.01-0.57) compared with the Q1 group, and the probability of one-month survival decreased as the time from the EMS call to epinephrine administration increased (p-value for trend = 0.009). Only four patients (0.9% [4/466]) with the earliest epinephrine administration showed a good neurological outcome.

2. Crit Care. 2022 Jun 20;26(1):184. doi: 10.1186/s13054-022-04052-7.

Advanced interventions in the pre-hospital resuscitation of patients with non-compressible haemorrhage after penetrating injuries.

Ter Avest E(1)(2)(3), Carenzo L(4)(5), Lendrum RA(4)(6), Christian MD(4)(7)(8), Lyon RM(9)(10), Coniglio C(11), Rehn M(12)(13)(14), Lockey DJ(4)(15), Perkins ZB(4)(16).

ABSTRACT

Early haemorrhage control and minimizing the time to definitive care have long been the cornerstones of therapy for patients exsanguinating from non-compressible haemorrhage (NCH) after penetrating injuries, as only basic treatment could be provided on scene. However, more recently, advanced on-scene treatments such as the transfusion of blood products, resuscitative thoracotomy (RT) and resuscitative endovascular balloon occlusion of the aorta (REBOA) have become available in a small number of pre-hospital critical care teams. Although these advanced techniques are included in the current traumatic cardiac arrest algorithm of the European Resuscitation Council (ERC), published in 2021, clear guidance on the practical application of these techniques in the pre-hospital setting is scarce. This paper provides a scoping review on how these advanced techniques can be incorporated into practice for the resuscitation of patients exsanguinating from NCH after penetrating injuries, based on available literature and the collective experience of several helicopter emergency medical services (HEMS) across Europe who have introduced these advanced resuscitation interventions into routine practice.

VENTILATION

No articles identified.

CERERBRAL MONITORING

1. J Pers Med. 2022 May 26;12(6):876. doi: 10.3390/jpm12060876.

Out-of-Sample Validity of the PROLOGUE Score to Predict Neurologic Function after Cardiac Arrest.

Schriefl C(1), Schoergenhofer C(2), Buchtele N(3), Mueller M(1), Poppe M(1), Clodi C(1), Ettl F(1), Merrelaar A(1), Boegl MS(1), Steininger P(4), Holzer M(1), Herkner H(1), Schwameis M(1).

ABSTRACT
BACKGROUND: The clinical value of a prognostic score depends on its out-of-sample validity because inaccurate outcome prediction can be not only useless but potentially fatal. We aimed to evaluate the out-of-sample validity of a recently developed and highly accurate Korean prognostic score for predicting neurologic outcome after cardiac arrest in an independent, plausibly related sample of European cardiac arrest survivors. METHODS: Analysis of data from a European cardiac arrest center, certified in compliance with the specifications of the German Council for Resuscitation. The study sample included adults with nontraumatic out-of-hospital cardiac arrest admitted between 2013 and 2018. Exposure was the PROgnostication using LOGistic regression model for Unselected adult cardiac arrest patients in the Early stages (PROLOGUE) score, including 12 clinical variables readily available at hospital admission. The outcome was poor 30-day neurologic function, as assessed using the cerebral performance category scale. The risk of a poor outcome was calculated using the PROLOGUE score regression equation. Predicted risk deciles were compared to observed outcome estimates in a complete-case analysis, a best-case analysis, and a multiple-data-imputation analysis using the Markov chain Monte Carlo method. RESULTS: A total of 1051 patients (median 61 years, IQR 50-71; 29% female) were analyzed. A total of 808 patients (77%) were included in the complete-case analysis. The PROLOGUE score overestimated the risk of poor neurologic outcomes in the range of 40% to 100% predicted risk, involving 63% of patients. The model fit did not improve after missing data imputation. CONCLUSIONS: In a plausibly related sample of European cardiac arrest survivors, risk prediction by the PROLOGUE score was largely too pessimistic and failed to replicate the high accuracy found in the original study. Using the PROLOGUE score as an example, this study highlights the compelling need for independent validation of a proposed prognostic score to prevent potentially fatal mispredictions.

2. Front Neurol. 2022 Jun 3;13:877406. doi: 10.3389/fneur.2022.877406. eCollection 2022.
Comatose Patients After Cardiopulmonary Resuscitation: An Analysis Based on Quantitative Methods of EEG Reactivity.
Huang H(1), Su Y(1), Niu Z(2), Liu G(1), Li X(2), Jiang M(1).
ABSTRACT
OBJECTIVE: Every year, approximately 50-110/1,00,000 people worldwide suffer from cardiac arrest, followed by hypoxic-ischemic encephalopathy after cardiopulmonary resuscitation (CPR), and approximately 40-66% of patients do not recover. The purpose of this study was to identify the brain network parameters and key brain regions associated with awakening by comparing the reactivity characteristics of the brain networks between the awakening and unawakening groups of CPR patients after coma, thereby providing a basis for further awakening interventions. METHOD: This study involved a prospective cohort study. Using a 64-electrode electro-encephalography (EEG) wireless 64A system, EEG signals were recorded from 16 comatose patients after CPR in the acute phase (<1 month) from 2019 to 2020. MATLAB (2017b) was used to quantitatively analyze the reactivity (power spectrum and entropy) and brain network characteristics (coherence and phase lag index) after pain stimulation. The patients were divided into an awakening group and an unawakening group based on their ability to execute commands or engage in repeated and continuous purposeful behavior after 3 months. The above parameters were compared to determine whether there were differences between the two groups. RESULTS: (1) Power spectrum: the awakening group had higher gamma, beta and alpha spectral power after pain stimulation in the frontal and parietal lobes, and lower delta and theta spectral power in the bilateral temporal and occipital lobes than the unawakening group. (2) Entropy: after pain stimulation, the awakening group had higher entropy in the frontal and parietal lobes and lower entropy in the temporal occipital lobes than the unawakening group. (3) Connectivity: after pain stimulation, the awakening

group had stronger gamma and beta connectivity in nearly the whole brain, but weaker theta and delta connectivity in some brain regions (e.g., the frontal-occipital lobe and parietal-occipital lobe) than the unawakening group. CONCLUSION: After CPR, comatose patients were more likely to awaken if there was a higher stimulation of fast-frequency band spectral power, higher entropy, stronger whole-brain connectivity and better retention of frontal-parietal lobe function after pain stimulation.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Resusc Plus. 2022 Jun 14;10:100245. doi: 10.1016/j.resplu.2022.100245. eCollection 2022 Jun.
Association between type of bystander cardiopulmonary resuscitation and survival in out-of-hospital cardiac arrest: A machine learning study.
Jerkeman M(1), Lundgren P(1)(2)(3), Omerovic E(1)(3), Strömsöe A(4), Riva G(4)(5), Hollenberg J(4)(5), Nivedahl P(1)(3), Herlitz J(2), Rawshani A(1)(3).

ABSTRACT
AIM: In the event of an out of hospital cardiac arrest (OHCA) it is recommended for a sole untrained bystander to perform compression only CPR (CO-CPR). However, it remains unknown if CO-CPR is inferior to standard CPR (S-CPR), including both compressions and ventilation, in terms of survival. One could speculate that due to the current pandemic, bystanders may be more hesitant performing mouth-to-mouth ventilation. The aim of this study is to assess the association between type of bystander CPR and survival in OHCA. METHODS: This study included all patients with a bystander treated OHCA between year 2015-2019 in ages 18-100 using The Swedish Registry for Cardio-pulmonary Resuscitation (SRCR). We compared CO-CPR to S-CPR in terms of 30-day survival using a propensity score approach based on machine learning adjusting for a large number of covariates. RESULTS: A total of 13,481 patients were included (5,293 with S-CPR and 8,188 with CO-CPR). The matched subgroup consisted of 2994 cases in each group. Gradient boosting were the best models with regards to predictive accuracy (for type of bystander CPR) and covariate balance. The difference between S-CPR and CO-CPR in all 30 models computed on covariate adjustment and 1-to-1 matching were non-significant. In the 30 weighted models, three comparisons (S-CPR vs. CO-CPR) were significant in terms of improved survival; odds ratio for men was 1.21 (99% confidence interval (CI) 1.02-1.43; Average treatment effect (ATE)); for patients ≥73 years 1.57 (99% CI 1.17-2.12) for Average treatment effect on treated (ATT) and 1.63 (99% CI 1.18-2.25) for ATE. Remaining 27 models showed no differences. No significances remain after adjustment for multiple testing. CONCLUSION: We found no significant differences between S-CPR and CO-CPR in terms of survival, supporting current recommendations for untrained bystanders regarding CO-CPR.

2. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz. 2022 Jun 20:1-7. doi: 10.1007/s00103-022-03557-4. Online ahead of print.
[The new 2021 resuscitation guidelines and the importance of lay resuscitation].
[Article in German; Abstract available in German from the publisher]
Horriar L(1), Rott N(2), Böttiger BW(1).

ABSTRACT
Lay resuscitation is one of the most important measures to increase the survival rate of patients after out-of-hospital cardiac arrest. While European countries, and especially Scandinavian

countries, achieve lay resuscitation rates of over 80%, the rate in Germany is only around 40%. The 2021 Resuscitation Guidelines updated by the European Resuscitation Council give special weight to Systems Saving Lives and focus on resuscitation by laypersons. The Systems Saving Lives emphasize the interplay between all actors involved in the chain of survival and thereby specify the link between the emergency service and the general population. Based on the BIG FIVE survival strategies after cardiac arrest, five key strategies are outlined that can achieve the greatest improvement in survival. These are (1) increasing lay resuscitation rates through campaigns and KIDS SAVE LIVES school-based resuscitation training, (2) implementing telephone resuscitation in dispatch centers, (3) first responder systems, (4) advanced life support, and (5) specialized cardiac arrest centers.

3. Eur Heart J. 2022 Jun 21;43(24):2257-2260. doi: 10.1093/eurheartj/ehac190.
How delivering cardiopulmonary resuscitation and basic life support skills training through places of worship can help save lives and address health inequalities.
Khanji MY(1)(2)(3), Waqar S(4), Khawaja Z(5), Ali B(6).
NO ABSTRACT AVAILABLE

4. Aust Crit Care. 2022 Jul;35(4):445-449. doi: 10.1016/j.aucc.2021.07.001. Epub 2021 Aug 26.
Time out! Pauses during advanced life support in high-fidelity simulation: A cross-sectional study.
Márquez-Hernández VV(1), Gutiérrez-Puertas L(2), García-Viola A(3), Garrido-Molina JM(3), Gutiérrez-Puertas V(3), Rodríguez-García MC(1), Aguilera-Manrique G(1).
ABSTRACT
BACKGROUND: Prolonged preshock pauses are associated with negative effects on patient outcomes and survival. A greater understanding of these pauses may help to improve the quality of advanced life support (ALS) and clinical outcomes. OBJECTIVE: The objective of this study was to identify the pauses that occur during ALS situations in high-fidelity simulation scenarios and the frequency and duration of these pauses. METHODS: One hundred forty-two nursing students participated in this cross-sectional study, involving high-fidelity simulation scenario of cardiorespiratory arrest in a simulated hospital room. Pauses were assessed using an observation checklist. RESULTS: Students performed the scenario in an average time of 8.32 (standard deviation = 1.13) minutes. Pauses between chest compressions were longer than recommended (mean = 0.36, standard deviation = 1.14). A strong positive correlation was found between the identification of the arrhythmia and the initiation of countershock ($r_s = 0.613$, $p < 0.001$). CONCLUSIONS: Nursing students generally performed ALS within the time limits recommended by resuscitation guidelines. Early identification of shockable rhythms may lead to early nurse-initiated defibrillation. Strategies to speed up the identification of arrhythmias should be put in place to minimise preshock pauses and improve ALS outcomes.

5. Resusc Plus. 2022 Jun 14;10:100255. doi: 10.1016/j.resplu.2022.100255. eCollection 2022 Jun.
Why are some ReSPECT conversations left incomplete? A qualitative case study analysis.
Eli K(1), Huxley CJ(1), Hawkes CA(1), Perkins GD(1)(2), Slowther AM(1), Griffiths F(1).
ABSTRACT
BACKGROUND: As an emergency care and treatment planning process (ECTP), a key feature of the Recommended Summary Plan for Emergency Care and Treatment (ReSPECT) is the engagement of patients and/or their representatives in conversations about treatment options including, but not limited to, cardiopulmonary resuscitation (CPR). However, qualitative research suggests that some ReSPECT conversations lead to partial or no decision-making about treatment recommendations. This paper explores why some ReSPECT conversations are left incomplete. METHODS: Drawing on

observation and interview data collected in four National Health Service (NHS) hospital sites in England, this paper offers an in-depth exploration of six case studies in which ReSPECT conversations were incomplete. Using thematic analysis, we triangulate fieldnote data documenting these conversations with interview data in which the doctors who conducted these conversations shared their perceptions and reflected on their decision-making processes. RESULTS: We identified two themes, both focused on 'mismatch': (1) Mismatch between the doctor's clinical priorities and the patient's/family's immediate needs; and (2) mismatch between the doctor's conversation scripts, which included patient autonomy, the feasibility of CPR, and what medicine can and should do to prolong a patient's life, and the patient's/family's understandings of these concepts. CONCLUSIONS: This case study analysis of six ReSPECT conversations found that mismatch between doctors' priorities and understandings and those of patients and/or their relatives led to incomplete ReSPECT conversations. Future research should explore methods to overcome these mismatches.

6. BMC Med Educ. 2022 Jun 22;22(1):483. doi: 10.1186/s12909-022-03533-1.
Virtual reality as a teaching method for resuscitation training in undergraduate first year medical students during COVID-19 pandemic: a randomised controlled trial.
Moll-Khosrawi P(1), Falb A(2), Pinnschmidt H(3), Zöllner C(2), Issleib M(2).
ABSTRACT
BACKGROUND: Virtual reality (VR) is a computer-generated simulation technique which yields plenty of benefits and its application in medical education is growing. This study explored the effectiveness of a VR Basic Life Support (BLS) training compared to a web-based training during the COVID-19 pandemic, in which face-to-face trainings were disrupted or reduced. METHODS: This randomised, double-blinded, controlled study, enrolled 1st year medical students. The control group took part in web-based BLS training, the intervention group received an additional individual VR BLS training. The primary endpoint was the no-flow time-an indicator for the quality of BLS-, assessed during a structural clinical examination, in which also the overall quality of BLS (secondary outcome) was rated. The tertiary outcome was the learning gain of the undergraduates, assessed with a comparative self-assessment (CSA). RESULTS: Data from 88 undergraduates (n = 46 intervention- and n = 42 control group) were analysed. The intervention group had a significant lower no-flow time ($p = .009$) with a difference between the two groups of 28% (95%-CI [8%;43%]). The overall BLS performance of the intervention group was also significantly better than the control group with a mean difference of 15.44 points (95%-CI [21.049.83]), $p < .001$. In the CSA the undergraduates of the intervention group reported a significant higher learning gain. CONCLUSION: VR proved to be effective in enhancing process quality of BLS, therefore, the integration of VR into resuscitation trainings should be considered. Further research needs to explore which combination of instructional designs leads to deliberate practice and mastery learning of BLS.

7. Nurs Ethics. 2022 Jun 23:9697330221090597. doi: 10.1177/09697330221090597. Online ahead of print.
Factors affecting the formation of nurses' moral sensitivity in cardiopulmonary resuscitation settings: A qualitative study.
Mohammadi F(1), Habibzadeh H(2), Aghakhani N(3).
ABSTRACT
Background: Certain factors may facilitate or inhibit the formation of moral sensitivity in nurses performing cardiopulmonary resuscitation (CPR). The identification of these factors in the context can help develop strategies to promote nurses' moral sensitivity and offer new insights into the consequences of their moral decisions. Objective: Taking into account the possibly multi-factorial nature of moral sensitivity, this study aimed to identify the factors affecting the formation of nurses'

moral sensitivity in CPR settings. Research design and methods: This study performed a conventional qualitative content analysis. Twenty-one participants were selected via purposive and theoretical sampling. The data were collected through in-depth semi-structured interviews and simultaneously analyzed via content analysis. Participants and research context: In total, twenty-one participants (fourteen clinical care nurses, three head nurses, two educational supervisors, and two faculty members) from different cities of Iran were interviewed. Ethical considerations: The research was approved by the Ethics Committee of Urmia University of Medical Sciences in Iran (IR.UMSU.REC.1399.337). Findings: Four categories (underlying factors, professional factors, organizational inhibitors of ethics, and professional limitations) and 13 sub-categories were extracted. Discussion: The formation of moral sensitivity requires a range of ethical standards and their maintenance, not only at the individual level but also at the profession, organization, and community levels. So eliminating inhibitors of ethics in these contexts can improve nurse's ethical performance in CPR settings. Conclusion: Any measures taken or decisions made by nurses in CPR are driven by numerous ethical issues to which nurses must be morally sensitive. Some factors facilitate and some inhibit the formation of moral sensitivity in nurses.

8. BMC Med Educ. 2022 Jun 22;22(1):484. doi: 10.1186/s12909-022-03563-9.
Effect of peer videorecording feedback CPR training on students' practical CPR skills: a randomized controlled manikin study.
Lin L(#)(1), Ni S(#)(1)(2), Liu Y(1)(3), Xue J(1), Ma B(1), Xiong D(1)(2), Zhao Y(4)(5), Jin X(6)(7).
ABSTRACT
BACKGROUND: The aim of this study was to compare one-month acquisition and half-a-year quality retention of cardiopulmonary resuscitation (CPR) skills after initial training of medical students between peer videorecording feedback training (PVF) and traditional peer verbal feedback training (TVF). METHODS: Participants were randomly assigned to the PVF group (n = 62) and the TVF group (n = 65). All participants received a 45-min CPR training program performed by an American Heart Association basic life support-certified instructor, and then they began two hours of practice in groups. During interactive peer learning, students cooperated in couples of a doer and a helper to realize maximization of each other's learning. In the PVF group, training performance feedback came from peers based on practice videorecording. In the TVF group, feedback came from peers verbally without videorecording. CPR quality was tested at 1 and 6 months after training. RESULTS: After 1 month of initial training, the PVF group had a better presentation of CPR skills acquisition than the TVF group. Compared to the TVF group, the PVF group had significantly higher total scores, compression depth, appropriate compression depth, and complete chest recoil ($p < 0.05$). Moreover, compression interruption was a significantly positive change in the PVF group compared to the TVF group ($p < 0.05$). However, after 6 months, proportions of appropriate compression depth in the PVF group were better than those in the TVF group ($p < 0.05$). The differences in total scores, compression depth, appropriate compression depth, complete chest recoil and compression interruption were non-significant (all $p > 0.05$). CONCLUSIONS: Compared to TVF, PVF is more effective in enhancing CPR skill acquisition at 1 month. After half a year, CPR skill quality was obviously reduced in both groups, and no difference in CPR quality was found between the two groups.

9. J Obstet Gynaecol India. 2022 Jun;72(3):192-200. doi: 10.1007/s13224-021-01568-w. Epub 2022 Jan 30.
Cardiopulmonary Resuscitation in Obstetric Patient: Special Considerations.
Kulkarni S(1), Futane SS(2).
ABSTRACT

The prevalence of cardiac arrest in pregnant women varies from 1/20,000 to 1/50,000 pregnancies and is associated with high fetomaternal mortality. The pregnant mother is more susceptible to cardiac arrest as hypoxia is poorly tolerated. Hemorrhage, eclampsia, sepsis, and embolism are common causes of arrest. Cardiac arrest is preventable if a predisposing clinical problem is detected in time by an early warning score and treated immediately. Resuscitation in obstetric patient is challenging and special as it involves the lives of two patients, the mother and the fetus. Physiological and anatomical changes during pregnancy need special considerations during cardiopulmonary resuscitation. Chest compressions, defibrillation, and drug administration guidelines are similar to those in non-pregnant women. Early endotracheal intubation by an expert is desirable but bag-mask ventilation with oxygen supplementation should be initiated immediately by the first responder to prevent hypoxia. Hyperventilation should be avoided. An intravenous line should be established above the level of the diaphragm. Manual left lateral uterine displacement is necessary to relieve aortocaval compression when uterine height is more than 20 weeks. Perimortem cesarean delivery at the site is a part of resuscitation if spontaneous circulation is not established within 4 min, after detection of the arrest. Echocardiography and ultrasonography can help to find out the etiology of the arrest. Targeted temperature management and extracorporeal cardiopulmonary resuscitation should be considered as needed. The newborn will be taken care of by a neonatologist. Following emergency protocols, early warning scores, training and updating resuscitation guidelines, simulations, collecting a national database of pregnant mothers along with the teamwork of obstetrician, anesthesiologist, neonatologist, and emergency physician can reduce fetomaternal mortality.

POST-CARDIAC ARREST TREATMENTS

1. Rev Esp Cardiol (Engl Ed). 2022 Jun 21:S1885-5857(22)00122-0. doi: 10.1016/j.rec.2022.05.013. Online ahead of print.

Coronary angiography in patients without ST-segment elevation following out-of-hospital cardiac arrest. [Article in English, Spanish]

Viana-Tejedor A(1), Andrea-Riba R(2), Scardino C(3), Ariza-Solé A(4), Bañeras J(5), García-García C(6), Jiménez Mena M(7), Vila M(8), Martínez-Sellés M(9), Pastor G(10), García Acuña JM(11), Loma-Osorio P(12), García Rubira JC(13), Jorge Pérez P(14), Pastor P(15), Ferrera C(16), Noriega FJ(16), Pérez Macías N(17), Fernández-Ortiz A(16), Pérez-Villacastín J(16); COUPE Investigators.

ABSTRACT

INTRODUCTION AND OBJECTIVES: The role of emergency coronary angiography (CAG) and percutaneous coronary intervention (PCI) following out-of-hospital cardiac arrest (OHCA) in patients without ST-segment elevation myocardial infarction (STEMI) remains unclear. We aimed to assess whether emergency CAG and PCI would improve survival with good neurological outcome in this population. METHODS: In this multicenter, randomized, open-label, investigator-initiated clinical trial, we randomly assigned 69 survivors of OHCA without STEMI to undergo immediate CAG or deferred CAG. The primary efficacy endpoint was a composite of in-hospital survival free of severe dependence. The safety endpoint was a composite of major adverse cardiac events including death, reinfarction, bleeding, and ventricular arrhythmias. RESULTS: A total of 66 patients were included in the primary analysis (95.7%). In-hospital survival was 62.5% in the immediate CAG group and 58.8% in the delayed CAG group (HR, 0.96; 95%CI, 0.45-2.09; P=.93). In-hospital survival free of severe dependence was 59.4% in the immediate CAG group and 52.9% in the delayed CAG group (HR, 1.29; 95%CI, 0.60-2.73; P=.4986). No differences were found in the secondary endpoints except for the incidence of acute kidney failure, which was more frequent in the immediate CAG group (15.6% vs 0%, P=.002) and infections, which were higher in the delayed CAG group (46.9% vs 73.5%, P=.003). CONCLUSIONS: In this underpowered randomized trial involving patients resuscitated after OHCA

without STEMI, immediate CAG provided no benefit in terms of survival without neurological impairment compared with delayed CAG.

TARGETED TEMPERATURE MANAGEMENT

1. Ther Hypothermia Temp Manag. 2022 Jun 24. doi: 10.1089/ther.2022.0019. Online ahead of print.
Association Between Procalcitonin Level at 72 Hours After Cardiac Arrest and Neurological Outcomes in Cardiac Arrest Survivors.
Lee JH(1), Lee DH(1), Lee BK(1)(2), Kim DK(1), Ryu SJ(1).

ABSTRACT
The association between procalcitonin (PCT) level measured 72 hours after cardiac arrest (CA) and neurological outcomes is unknown. We aimed to examine the association of serial PCT levels up to 72 hours with neurological outcomes in patients who underwent targeted temperature management (TTM) after CA. This retrospective observational study included adult comatose patients with CA undergoing TTM (33°C for 24 hours) at the Chonnam National University Hospital in Gwangju, Korea, between January 2018 and December 2020. PCT levels were measured at admission and at 24, 48, and 72 hours after CA. The presence of early-onset infections (within 7 days after CA) was confirmed by reviewing clinical, radiological, and microbiological data. The primary outcome was poor neurological outcomes at 6 months and was defined by cerebral performance category 3-5. Among the CA survivors, 118 were included and 67 (56.8%) had poor neurological outcomes. The PCT level at 72 hours in the poor outcome group (3.01 [0.88-12.71]) was higher than that in good outcome group (0.56 [0.18-1.32]). The multivariate analysis revealed that the PCT level at 72 hours (adjusted odds ratio 1.241; 95% confidence interval, 1.059-1.455) was independently associated with poor neurological outcomes, showed good performance for poor outcomes (area under the receiver operating characteristic curve of 0.823), and was not associated with early-onset infections. The PCT level at 72 hours after CA can be helpful in predicting prognosis, and it did not correlate with early-onset infections in the study.

2. Medicina (Kaunas). 2022 Jun 15;58(6):804. doi: 10.3390/medicina58060804.
Efficacy of Quantitative Pupillary Light Reflex for Predicting Neurological Outcomes in Patients Treated with Targeted Temperature Management after Cardiac Arrest: A Systematic Review and Meta-Analysis.
Kim JG(1), Shin H(2), Lim TH(2), Kim W(1), Cho Y(1), Jang BH(3), Choi KS(4), Na MK(4), Ahn C(5), Lee J(2).

ABSTRACT
Background and objectives: This study aims to evaluate the usefulness of the quantitative pupillary light reflex as a prognostic tool for neurological outcomes in post-cardiac arrest patients treated with targeted temperature management (TTM). Material and Methods: We systematically searched MEDLINE, EMBASE, and the Cochrane Library (search date: 9 July 2021) for studies on post-cardiac arrest patients treated with TTM that had measured the percent constriction of pupillary light reflex (%PLR) with quantitative pupillometry as well as assessed the neurological outcome. For an assessment of the methodological quality of the included studies, two authors utilized the prognosis study tool independently. Results: A total of 618 patients from four studies were included in this study. Standardized mean differences (SMDs) were calculated to compare patients with good or poor neurological outcomes. A higher %PLR measured at 0-24 h after hospital admission was related to good neurological outcomes at 3 months in post-cardiac arrest patients treated with TTM (SMD 0.87; 95% confidence interval 0.70-1.05; I2 = 0%). A higher %PLR amplitude measured at 24-48 h after hospital admission was also associated with a good neurological outcome at 3 months in post-

cardiac arrest patients treated with TTM, but with high heterogeneity (standardized mean difference 0.86; 95% confidence interval 0.40-1.32; I2 = 70%). The evidence supporting these findings was of poor quality. For poor neurological outcome, the prognosis accuracy of %PLR was 9.19 (pooled diagnostic odds ratio, I2 = 0%) and 0.75 (area under the curve). Conclusions: The present meta-analysis could not reveal that change of %PLR was an effective tool in predicting neurological outcomes for post-cardiac arrest patients treated with TTM owing to a paucity of included studies and the poor quality of the evidence.

3. J Chin Med Assoc. 2022 Jun 21. doi: 10.1097/JCMA.0000000000000767. Online ahead of print.
Prognostic Significance of The Blood Urea Nitrogen to Creatinine Ratio in In-Hospital Cardiac Arrest after Targeted Temperature Management.
Meng YH(1), Lin PY(1), Wu YH(2), Hou PC(3), How CK(1)(4)(5), Chen CT(1)(4)(6).
ABSTRACT
BACKGROUND: Targeted temperature management (TTM) has been reported to improve outcomes in in-hospital cardiac arrest (IHCA) patients but little has been investigated into the relationship between prognoses and the blood urea nitrogen to creatinine ratio (BCR). METHODS: A retrospective analysis of data from IHCA survivors treated with TTM between 2011 and 2018 was conducted based on the Research Patient Database Registry of the Partners HealthCare system in Boston. Serum laboratory data were measured during IHCA and within 24 hours after TTM completion. Intra-arrest and post-TTM BCRs were calculated, respectively. The primary outcome was neurologic status at discharge. The secondary outcome was in-hospital mortality. RESULTS: The study included 84 patients; 63 (75%) were discharged with a poor neurologic status, and 40 (47.6%) died. Regarding poor neurological outcome at discharge, multivariate analysis revealed that post-TTM BCR was a significant predictor (adjusted OR: 1.081, 95% CI: 1.002-1.165, p = 0.043), and intra-arrest BCR was a marginal predictor (adjusted OR: 1.067, 95% CI: 1.000-1.138, p = 0.050). Post-TTM BCR had an acceptably predictive ability to discriminate neurological status at discharge, with an area under the receiver-operating characteristic curve of 0.644 (95% CI: 0.516-0.773) and a post-TTM BCR cutoff value of 16.7 had a sensitivity of 61.9% and a specificity of 70.0%. CONCLUSION: Post-TTM BCR was a significant predictor for neurologic outcome at discharge among IHCA patients receiving TTM. IHCA patients with elevated intra-arrest BCR also had a borderline poor neurological prognosis at discharge.

4. Front Med (Lausanne). 2022 Jun 3;9:910560. doi: 10.3389/fmed.2022.910560. eCollection 2022.
Targeted Temperature Management for Cardiac Arrest Due to Non-shockable Rhythm: A Systematic Review and Meta-Analysis of Randomized Controlled Trials.
Zhu YB(1), Yao Y(2), Ren Y(2), Feng JZ(2), Huang HB(2).
ABSTRACT
BACKGROUND: Targeted temperature management (TTM) is recommended in adult patients following cardiac arrest (CA) with any rhythm. However, as to non-shockable (NSR) CA, high-quality evidence of TTM supporting its practices remains uncertain. Thus, we aimed to conduct a systematic review and meta-analysis with randomized controlled trials (RCTs) to explore the efficacy and safety of TTM in this population. METHODS: We searched PubMed, Embase, and Cochrane library databases for potential trials from inception through Aug 25, 2021. RCTs evaluating TTM for CA adults due to NSR were included, regardless of the timing of cooling initiation. Outcome measurements were mortality and good neurological function. We used the Cochrane bias tools to evaluate the quality of the included studies. Heterogeneity, subgroup analyses, and sensitivity analysis were investigated to test the robustness of the primary outcomes. RESULTS: A total of 14 RCTs with 4,009 adults were eligible for the final analysis. All trials had a low to moderate risk of

bias. Of the included trials, six compared NSR patients with or without TTM, while eight compared pre-hospital to in-hospital TTM. Pooled data showed that TTM was not associated with improved mortality (Risk ratio [RR] 1.00; 95% CI, 0.944-1.05; P = 0.89, I 2 = 0%) and good neurological outcome (RR 1.18; 95% CI 0.90-1.55; P = 0.22, I 2 = 8%). Similarly, use of pre-hospital TTM resulted in neither an improved mortality (RR 0.99, 95% CI 0.97-1.03; I 2 = 0%, P = 0.32) nor favorable neurological outcome (RR 1.13, 95% CI 0.93-1.38; I 2 = 0%, P = 0.22). These results were further confirmed in the sensitivity analyses and subgroup analyses. CONCLUSIONS: Our results showed that using the TTM strategy did not significantly affect the mortality and neurologic outcomes in CA survival presenting initial NSR.

5. Acta Anaesthesiol Scand. 2022 Jul;66(6):704-712. doi: 10.1111/aas.14063. Epub 2022 Apr 10.
Increased risk of ventilator-associated pneumonia in patients after cardiac arrest treated with mild therapeutic hypothermia.
Hasslacher J(1), Steinkohl F(2), Ulmer H(3), Lehner G(1), Klein S(1), Mayerhoefer T(1), Joannidis M(1).
ABSTRACT
BACKGROUND: We aimed at investigating the incidence, characteristics and outcome of ventilator-associated pneumonia (VAP) in patients after cardiac arrest (CA) and its potential association with mild therapeutic hypothermia (MTH). We hypothesized, that MTH might increase the risk of VAP. METHODS: Prospective observational study including comatose adult patients after successful resuscitation from out-of-hospital or in-hospital CA with presumed cardiac cause admitted to ICU and treated with MTH at 33°C for 24 h or normothermia (NT) with treatment of fever ≥38°C by pharmacological means. The primary outcome measure was the development of VAP. VAP diagnosis included mechanical ventilation >48 h combined with clinical and radiologic criteria. For a microbiologically confirmed VAP (mcVAP), a positive respiratory culture was required. RESULTS: About 23% of 171 patients developed VAP, 6% presented with mcVAP. VAP was associated with increased ICU-LOS (9 (IQR 5-14) vs. 6 (IQR 3-9) days; p < .01), ventilator-dependent days (6 (IQR 4-9) vs. 4 (IQR 2-7) days; p < .01) and duration of antibiotic treatment (9 (IQR 5-13) vs. 5 (IQR 2-9) days; p < .01), but not with mortality (OR 0.88 (95% CI: 0.43-1.81); p = .74). Patients treated with MTH (47%) presented higher VAP (30% vs. 17%; p = .04) and mcVAP rates (11% vs. 2%; p = .03). MTH was associated with VAP in multivariable logistic regression analysis with an OR of 2.67 (95% CI: 1.22-5.86); p = .01. CONCLUSIONS: VAP appears to be a common complication in patients after CA, accompanied by more ventilator-dependent days, prolonged antibiotic treatment, and ICU-LOS. Treatment with MTH is significantly associated with development of VAP.

6. Eur Heart J Acute Cardiovasc Care. 2022 Jun 22;11(6):512-521. doi: 10.1093/ehjacc/zuac054.
Targeted temperature management after out of hospital cardiac arrest: quo vadis?
Krychtiuk KA(1), Fordyce CB(2)(3), Hansen CM(4)(5), Hassager C(5), Jentzer JC(6), Menon V(7), Perman SM(8), van Diepen S(9)(10)(11), Granger CB(1).
ABSTRACT
Targeted temperature management (TTM) has become a cornerstone in the treatment of comatose post-cardiac arrest patients over the last two decades. Belief in the efficacy of this intervention for improving neurologically intact survival was based on two trials from 2002, one truly randomized-controlled and one small quasi-randomized trial, without clear confirmation of that finding. Subsequent large randomized trials reported no difference in outcomes between TTM at 33 vs. 36°C and no benefit of TTM at 33°C as compared with fever control alone. Given that these results may help shape post-cardiac arrest patient care, we sought to review the history and rationale as well as trial evidence for TTM, critically review the TTM2 trial, and highlight gaps in knowledge and

research needs for the future. Finally, we provide contemporary guidance for the use of TTM in daily clinical practice.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. BMC Med Inform Decis Mak. 2022 Jun 20;22(Suppl 2):159. doi:10.1186/s12911-022-01886-7.
AEDNav: indoor navigation for locating automated external defibrillator.
Rao G(1), Mago V(2), Lingras P(3), Savage DW(4).

ABSTRACT
BACKGROUND: In a sudden cardiac arrest, starting CPR and applying an AED immediately are the two highest resuscitation priorities. Many existing mobile applications have been developed to assist users in locating a nearby AED. However, these applications do not provide indoor navigation to the AED location. The time required to locate an AED inside a building due to a lack of indoor navigation systems will reduce the patient's chance of survival. The existing indoor navigation solutions either require special hardware, a large dataset or a significant amount of initial work. These requirements make these systems not viable for implementation on a large-scale. METHODS: The proposed system collects Wi-Fi information from the existing devices and the path's magnetic information using a smartphone to guide the user from a starting point to an AED. The information collected is processed using four techniques: turn detection method, Magnetic data pattern matching method, Wi-Fi fingerprinting method and Closest Wi-Fi location method to estimate user location. The user location estimations from all four techniques are further processed to determine the user's location on the path, which is then used to guide the user to the AED location. RESULTS: The four techniques used in the proposed system Turn detection, Magnetic data pattern matching, Closest Wi-Fi location and Wi-Fi fingerprinting can individually achieve the accuracy of 80% with the error distance ± 9.4 m, ± 2.4 m, ± 4.6 m, and ± 4.6 m respectively. These four techniques, applied individually, may not always provide stable results. Combining these techniques results in a robust system with an overall accuracy of 80% with an error distance of ± 2.74 m. In comparison, the proposed system's accuracy is higher than the existing systems that use Wi-Fi and magnetic data. CONCLUSION: This research proposes a novel approach that requires no special hardware, large scale data or significant initial work to provide indoor navigation. The proposed system AEDNav can achieve an accuracy similar to the existing indoor navigation systems. Implementing this indoor navigation system could reduce the time to locate an AED and ultimately increase patient survival during sudden cardiac arrest.

PEDIATRICS AND CHILDREN

1. Am J Emerg Med. 2022 Jun 2;58:275-280. doi: 10.1016/j.ajem.2022.05.038. Online ahead of print.
Association between patient age and pediatric cardiac arrest recognition by emergency medical dispatchers.
Kim TH(1), Jung JH(2), Song KJ(3), Hong KJ(4), Jeong J(5), Lee SGW(6).

ABSTRACT
BACKGROUND: Dispatcher-assisted cardiopulmonary resuscitation (DA-CPR) is an important prognostic factor in pediatric out-of-hospital cardiac arrest (OHCA). The recognition of cardiac arrest by dispatcher is a key factor for successful DA-CPR. In this study, we evaluated the association between pediatric age and dispatcher recognition. METHODS: A retrospective observational study was designed using a nationwide OHCA registry. Patients under 19 years of age were enrolled. Patients were categorized into four groups according to age (<1 year, 1-6 years, 7-13 years, and 14-18 years). The primary outcome was cardiac arrest recognition by dispatcher. A multivariable logistic

regression analysis was performed. RESULTS: A total of 2754 pediatric OHCA patients were enrolled. A negative trend was observed between age and dispatcher performance ($p < 0.01$). The rate of cardiac arrest recognition was highest in patients under one year of age (61.5%) and lowest in patients ages 14-18 years old (47.1%). Patients in the 7-13 years and 14-18 years age groups were both associated with a decreased rate of recognition (adjusted odds ratio with 95% confidence interval: 0.55 (0.41-0.74) and 0.44 (0.34-0.57), respectively). In the interaction analysis, the association between age and outcomes was more prominent in patients with non-medical causes. CONCLUSION: Patients ages 7-18 years old were negatively associated with cardiac arrest recognition and DA-CPR instruction provision within optimal timeframes compared to those younger than one year old. Development of a tailored protocol could be considered according to age and cause of arrest for better dispatcher performance in pediatric OHCA patients.

2. BMC Pediatr. 2022 Jun 24;22(1):365. doi: 10.1186/s12887-022-03411-1.

Health professionals' initial experiences and perceptions of the acceptability of a whole-hospital, pro-active electronic paediatric early warning system (the DETECT study): a qualitative interview study.

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ABSTRACT

BACKGROUND: Paediatric early warning systems (PEWS) alert health professionals to signs of a child's deterioration with the intention of triggering an urgent review and escalating care. They can reduce unplanned critical care transfer, cardiac arrest, and death. Electronic systems may be superior to paper-based systems. The objective of the study was to critically explore the initial experiences and perceptions of health professionals about the acceptability of DETECT e-PEWS, and what factors influence its acceptability. METHODS: A descriptive qualitative study (part of The DETECT study) was undertaken February 2020-2021. Single, semi-structured telephone interviews were used. The setting was a tertiary children's hospital, UK. The participants were health professionals working in study setting and using DETECT e-PEWS. Sampling was undertaken using a mix of convenience and snowballing techniques. Participants represented two user-groups: 'documenting vital signs' (D-VS) and 'responding to vital signs' (R-VS). Perceptions of clinical utility and acceptability of DETECT e-PEWS were derived from thematic analysis of transcripts. RESULTS: Fourteen HPs (12 nurses, 2 doctors) participated; seven in D-VS and seven in the R-VS group. Three main themes were identified: complying with DETECT e-PEWS, circumventing DETECT e-PEWS, and disregarding DETECT e-PEWS. Overall clinical utility and acceptability were deemed good for HPs in the D-VS group but there was diversity in perception in the R-VS group (nurses found it more acceptable than doctors). Compliance was better in the D-VS group where use of DETECT e-PEWS was mandated and used more consistently. Some health professionals circumvented DETECT e-PEWS and fell back into old habits. Doctors (R-VS) did not consistently engage with DETECT e-PEWS, which reduced the acceptability of the system, even in those who thought the system brought benefits. CONCLUSIONS: Speed and accuracy of real-time data, automation of triggering alerts and improved situational awareness were key factors that contributed to the acceptability of DETECT e-PEWS. Mandating use of both recording and responding aspects of DETECT e-PEWS is needed to ensure full implementation.

3. Semin Perinatol. 2022 May 21:151624. doi: 10.1016/j.semperi.2022.151624. Online ahead of print.

Chest compressions and medications during neonatal resuscitation.

Ramachandran S(1), Bruckner M(2), Kapadia V(3), Schmölzer GM(4).

ABSTRACT

Prolonged resuscitation in neonates, although quite rare, may occur in response to profound intractable bradycardia as a result of asphyxia. In these instances, chest compressions and medications may be necessary to facilitate return of spontaneous circulation. While performing chest compressions, the two thumb method is preferred over the two finger technique, although several newer approaches are under investigation. While the ideal compression to ventilation ratio is still uncertain, a 3:1 ratio remains the recommendation by the Neonatal Resuscitation Program. Use of feedback mechanisms to optimize neonatal cardiopulmonary resuscitation (CPR) show promise and are currently under investigation. While performing optimal cardiac compressions to pump blood, use of medications to restore spontaneous circulation will likely be necessary. Current recommendations are that epinephrine, an endogenous catecholamine be used preferably intravenously or by intraosseous route, with the dose repeated every 3-5 minutes until return of spontaneous circulation. Finally, while the need for volume replacement is rare, it may be considered in instances of acute blood loss or poor response to resuscitation.

4. Children (Basel). 2022 Jun 17;9(6):910. doi: 10.3390/children9060910.

A Comparison between Three Different Techniques Considering Quality Skills, Fatigue and Hand Pain during a Prolonged Infant Resuscitation: A Cross-Over Study with Lifeguards.

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ABSTRACT

The aim of the study was to compare the quality of CPR (Q-CPR), as well as the perceived fatigue and hand pain in a prolonged infant cardiopulmonary resuscitation (CPR) performed by lifeguards using three different techniques. A randomized crossover simulation study was used to compare three infant CPR techniques: the two-finger technique (TF); the two-thumb encircling technique (TTE) and the two-thumb-fist technique (TTF). 58 professional lifeguards performed three tests in pairs during a 20-min period of CPR. The rescuers performed compressions and ventilations in 15:2 cycles and changed their roles every 2 min. The variables of analysis were CPR quality components, rate of perceived exertion (RPE) and hand pain with numeric rating scale (NRS). All three techniques showed high Q-CPR results (TF: 86 ± 9%/TTE: 88 ± 9%/TTF: 86 ± 16%), and the TTE showed higher values than the TF (p = 0.03). In the RPE analysis, fatigue was not excessive with any of the three techniques (values 20 min between 3.2 for TF, 2.4 in TTE and 2.5 in TTF on a 10-point scale). TF reached a higher value in RPE than TTF in all the intervals analyzed (p < 0.05). In relation to NRS, TF showed significantly higher values than TTE and TTF (NRS minute 20 = TF 4.7 vs. TTE 2.5 & TTF 2.2; p < 0.001). In conclusion, all techniques have been shown to be effective in high-quality infant CPR in a prolonged resuscitation carried out by lifeguards. However, the two-finger technique is less efficient in relation to fatigue and hand pain compared with two-thumb technique (TF vs. TTF, p = 0.01).

EXTRACORPOREAL LIFE SUPPORT

No articles identified.

EXPERIMENTAL RESEARCH

1. Front Cell Dev Biol. 2022 Jun 3;10:891996. doi: 10.3389/fcell.2022.891996. eCollection 2022.
Carbamazepine Increases the Risk of Sudden Cardiac Arrest by a Reduction of the Cardiac Sodium Current.
Jia L(1), Eroglu TE(2)(3), Wilders R(4), Verkerk AO(1)(4), Tan HL(1)(5).
ABSTRACT
Aim: To assess the risk of sudden cardiac arrest (SCA) associated with the use of carbamazepine (CBZ) and establish the possible underlying cellular electrophysiological mechanisms. Methods: The SCA risk association with CBZ was studied in general population cohorts using a case-control design (n = 5,473 SCA cases, 21,866 non-SCA controls). Effects of 1-100 μM CBZ on action potentials (APs) and individual membrane currents were determined in isolated rabbit and human cardiomyocytes using the patch clamp technique. Results: CBZ use was associated with increased risk of SCA compared with no use (adjusted odds ratio 1.90 [95% confidence interval: 1.12-3.24]). CBZ reduced the AP upstroke velocity of rabbit and human cardiomyocytes, without prominent changes in other AP parameters. The reduction occurred at ≥30 μM and was frequency-dependent with a more pronounced reduction at high stimulus frequencies. The cardiac sodium current (INa) was reduced at ≥30 μM; this was accompanied by a hyperpolarizing shift in the voltage-dependency of inactivation. The recovery from inactivation was slower, which is consistent with the more pronounced AP upstroke velocity reduction at high stimulus frequencies. The main cardiac K+ and Ca2+ currents were unaffected, except reduction of L-type Ca2+ current by 100 μM CBZ. Conclusion: CBZ use is associated with an increased risk of SCA in the general population. At concentrations of 30 μM and above, CBZ reduces AP upstroke velocity and INa in cardiomyocytes. Since the concentration of 30 μM is well within the therapeutic range (20-40 μM), we conclude that CBZ increases the risk of SCA by a reduction of the cardiac INa.

CASE REPORTS

1. Medicina (Kaunas). 2022 Jun 16;58(6):815. doi: 10.3390/medicina58060815.
Short-Term Treatment with Empagliflozin Resulted in Dehydration and Cardiac Arrest in an Elderly Patient with Specific Complications: A Case Report and Literature Review.
Supakul S(1), Nishikawa Y(2), Teramura M(3), Takase T(3).
ABSTRACT
Empagliflozin is a sodium-glucose cotransporter-2 inhibitor widely used in the treatment of diabetes mellitus and heart failure. Our case study involved a 68-year-old patient who was admitted to the hospital because of a cerebral infarction. The patient was simultaneously diagnosed with diabetes mellitus and heart failure, for which empagliflozin was initiated. However, food and fluid intake were reduced due to poor appetite. In addition to the side effects of empagliflozin, the patient developed severe dehydration and cardiac arrest. Careful assessment of dehydration and preventive water intake is recommended in elderly patients and those with neurological deficits, especially when receiving empagliflozin.

2. Medicina (Kaunas). 2022 Jun 2;58(6):759. doi: 10.3390/medicina58060759.
Early Use of ECMO for Refractory Kounis Syndrome Concealed by General Anesthesia-A Case Report.
Yu HK(1), Park M(1), Lee SH(1)(2)(3), Woo JW(4), Kang DH(5), Byun JH(6), Ok SH(1)(2)(3).
ABSTRACT

A 46-year-old woman demonstrated refractory Kounis syndrome (KS) after induction of anesthesia. Despite conventional management of anaphylaxis and advanced cardiac life support, her cardiovascular function continued to deteriorate until she had a cardiac arrest, and after extracorporeal membrane oxygenation (ECMO) therapy, electrical cardiac activity reappeared. A large number of patients with KS-"allergic angina syndrome"-has been known to recover well with vasodilators; however, this patient showed antibiotics-induced refractory KS during general anesthesia. Severe bronchospasms with desaturation appeared as initial anaphylactic features; however, these did not respond to conventional treatment for anaphylaxis. Patient's hemodynamic signs eventually worsened, leading to cardiac arrest despite ephedrine administration and chest compressions. During cardiopulmonary cerebral resuscitation, the central line was secured, and epinephrine, atropine, as well as sodium bicarbonate were administered repeatedly; nevertheless, cardiac arrest was sustained. After initiation of veno-arterial ECMO, atrial fibrillation was observed, which was later converted to sinus tachycardia by electrical cardioversions and amiodarone. Coronary angiography was performed before the patient was admitted to the intensive care unit; there were no indications of an impending cardiac arrest. The patient was discharged uneventfully owing to early use of ECMO despite the emergence of KS symptoms that were initially masked by anesthesia but later worsened abruptly.

3. J Cardiovasc Dev Dis. 2022 Jun 9;9(6):184. doi: 10.3390/jcdd9060184.
Resuscitated Sudden Cardiac Arrest of a Neonate with Congenital LQT Syndrome-Associated Torsades de Pointes: A Case Report and Literature Review.
Hsu YT(1), Lee PC(2), Chen YH(1), Yeh SJ(1), Chen MR(1), Hsu KH(3), Chang CI(3), Lai WT(4), Hung WL(1).
ABSTRACT
Sudden infant death syndrome (SIDS), the most common cause of infant death in developed countries, is attributed to diverse trigger factors. Malignant cardiac dysrhythmias are potentially treatable etiologies, and congenital long QT syndrome (LQTS) is the most common cardiac ionic channelopathy confronted. β-Blockers or class Ib agents are the drugs of choice for the control of arrhythmias, and an implantable cardioverter defibrillator (ICD) should be considered for secondary prevention in survivors of lethal cardiac death. We report the case of a 4-day old neonate, later genetically confirmed as LQT type 3 (LQT3), who survived a pulseless torsades de pointes (TdP) attack and was successfully treated with propranolol, mexiletine, and ICD implantation.

4. Hematol Rep. 2022 Jun 2;14(2):203-209. doi: 10.3390/hematolrep14020027.
Sudden Cardiac Death in a Patient with Thrombotic Thrombocytopenic Purpura: A Case Report.
Yoshida K(1), Murata S(1), Morimoto M(1), Mushino T(1), Tanaka K(1), Yamashita Y(1), Hosoi H(1), Nishikawa A(1), Tamura S(1), Hatakeyama K(2), Matsumoto M(3), Sonoki T(1).
ABSTRACT
A 49-year-old female was admitted to our hospital with malaise and gross hematuria. As ADAMTS13 (a disintegrin-like and metalloproteinase with thrombospondin type 1 motifs 13) activity was absent and the ADAMTS13 inhibitor was detected, she was diagnosed with acquired thrombotic thrombocytopenic purpura (TTP). In addition to plasma exchange and corticosteroid therapy, she received rituximab therapy for inhibitor boosting but died suddenly of a cardiac arrest on day 9. The postmortem revealed microvascular platelet thrombi in multiple organs. In this case, the deterioration of the patient's clinical status was considered to have been caused by inhibitor boosting-induced systemic microvascular occlusion. In particular, her sudden death may have been due to cardiovascular microthrombosis. Since inhibitor boosting can cause TTP patients to deteriorate rapidly, it is crucial to manage TTP patients who undergo inhibitor boosting

appropriately. The monitoring of cardiac complications in TTP patients may also be essential, especially in the acute phase.