

This week's PubMed 16th – 22nd October 2022: articles of interest n = 42

CPR AND COVID-19

1. Resusc Plus. 2022 Oct 11:100317. doi: 10.1016/j.resplu.2022.100317. Online ahead of print.

Early Changes in Hospital Resuscitation Practices During the COVID-19 Pandemic.

Secrest KM(1), Anderson TM(1), Trumpower B(2), Harrod M(2), Krein SL(1)(2), Guetterman TC(3), Chan PS(4), Nallamotheu BK(1)(2).

ABSTRACT

BACKGROUND: The coronavirus disease 2019 (COVID-19) pandemic resulted in many disruptions in care for patients experiencing in-hospital cardiac arrest (IHCA)s. We sought to identify changes made in hospital resuscitation practices during progression of the COVID-19 pandemic. **METHODS:** We conducted a descriptive qualitative study using in-depth interviews of clinical staff leadership involved with resuscitation care at a select group of U.S. acute care hospitals in the national American Heart Association Get With The Guidelines-Resuscitation registry for IHCA. We focused interviews on resuscitation practice changes for IHCA since the initiation of the COVID-19 pandemic. We used rapid analysis techniques for qualitative data summarization and analysis. **RESULTS:** A total of 6 hospitals were included with interviews conducted with both physicians and nurses between November 2020 and April 2021. Three topical themes related to shifts in resuscitation practice through the COVID-19 pandemic were identified: 1) ensuring patient and provider safety and wellness (e.g., use of personal protective equipment); 2) changing protocols and training for routine educational practices (e.g., alterations in mock codes and team member roles); and 3) goals of care and end of life discussions (e.g., challenges with visitor and family policies). We found advances in leveraging technology use as an important topic that helped institutions address challenges across all 3 themes. **CONCLUSIONS:** Early on, the COVID-19 pandemic resulted in many changes to resuscitation practices at hospitals placing an emphasis on enhanced safety, training, and end of life planning. These lessons have implications for understanding how systems may be better designed for resuscitation efforts.

CPR/MECHANICAL CHEST COMPRESSION

No articles identified.

REGISTRIES, REVIEWS AND EDITORIALS

1. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2022 Oct 18. doi: 10.5507/bp.2022.044. Online ahead of print.

Impact of admitting department on the management of acute coronary syndrome after an out of hospital cardiac arrest.

Jansky P(1)(2), Motovska Z(3), Kroupa J(3), Waldauf P(2), Kafka P(2), Knot J(3), Jarkovsky J(4).

ABSTRACT

AIM: This study aimed to analyze the influence of the hospital admitting department on adherence to the Guidelines of European Society of Cardiology for management of acute coronary syndromes in patients after out-of-hospital cardiac arrest (OHCA) of coronary etiology. **METHODS:** We studied retrospective-prospective register of 102 consecutive patients with OHCA as a manifestation of

acute coronary syndrome (ACS). Patients were admitted to the coronary care unit (CCU) 52, general intensive care unit (GICU) 21, or GICU after initial Cath lab treatment (CAG-GICU) 29. This study compared the differences in the management of ACS in patients with OHCA of coronary etiology based on the admitting department in a tertiary care institution. RESULTS: Twelve of the 21 (57.1%) patients admitted to the GICU were evaluated as having ACS on-site where they experienced OHCA. In the CCU group, 50 out of 52 (96.2%) and 28 of 29 (100%) patients in the CAG-GICU group ($P<0.001$). Coronary angiography was performed in 10 of 21 patients (48%) admitted to the GICU. It was performed in 49 out of 52 (94%) CCU patients and, in the CAG-GICU group, 28 out of 29 patients. The mean time to CAG differed significantly across groups (that is, GICU 200.7 min., CCU 71.2 min., and CAG-GICU 7.5 min. ($P<0.001$)). Aspirin was used in 48% of GICU, 96% of CCU, and 79% of CAG-GICU patients ($P<0.001$), while in the pre-hospital phase, aspirin was used in 9.5% of GICU, 71.2% of CCU, and 50% of CAG-GICU patients ($P<0.001$). P2Y12 inhibitor prescriptions were lower in patients admitted to the GICU (33% vs. 89% CCU and 57% CAG-GICU, $P<0.001$). The department's choice significantly affected the time to initiation of antithrombotics, which was the longest in the GICU. CONCLUSION: The choice of admission department for patients with OHCA caused by ACS was found to affect the extent to which the recommended treatments were used. An examination of OHCA patients by a cardiologist upon admission to the hospital increased the likelihood of an early diagnosis of ACS as the cause of OHCA.

2. Prehosp Emerg Care. 2022 Oct 18:1-18. doi: 10.1080/10903127.2022.2137745. Online ahead of print.

Machine learning analysis to identify data entry errors in prehospital patient care reports: a case study of a national out-of-hospital cardiac arrest registry.

Choi DH(1)(2), Park JH(2)(3), Choi YH(2)(4), Song KJ(2)(5), Kim S(1)(6), Shin SD(2)(3).

ABSTRACT

Background: To develop and validate machine learning models for data entry error detection in a national out-of-hospital cardiac arrest (OHCA) prehospital patient care report database. Methods: Adult OHCA of presumed cardiac etiology were included. Data entry errors were defined as discrepancies between the coded data and the free-text note documenting the intervention or event; for example, information that was recorded as "absent" in the coded data but "present" in the free-text note. Machine learning models using the extreme gradient boosting, logistic regression, extreme gradient boosting outlier detection, and K-nearest neighbor outlier detection algorithms for error detection within nine core variables were developed and then validated for each variable. Results: Among 12,100 OHCA, the proportion of cases with at least one error type was 16.2%. The area under the receiver operating characteristic curve (AUC) of the best-performing model (model with the highest AUC for each outcome variable) was 0.71-0.95. Machine learning models detected errors most efficiently for outcome place and initial rhythm errors; 82.6% of place errors and 93.8% of initial rhythm errors could be detected while checking 11% and 35% of data, respectively, compared to the strategy of checking all data. Conclusion: Machine learning models can detect data entry errors in care reports of EMS clinicians with acceptable performance and likely can improve the efficiency of the process of data quality control. EMS organizations that provide more prehospital interventions for OHCA patients could have higher error rates and may benefit from the adoption of error-detection models.

3. JACC Clin Electrophysiol. 2022 Oct;8(10):1271-1273. doi: 10.1016/j.jacep.2022.07.019.

New Insights Into Cardiac Arrest From Pulseless Electrical Activity.

Halperin HR(1), Ambinder DI(2), Oberdier MT(2).

NO ABSTRACT AVAILABLE

IN-HOSPITAL CARDIAC ARREST

1. Minerva Med. 2022 Oct 18. doi: 10.23736/S0026-4806.22.07780-1. Online ahead of print.

Risk stratification and long-term outcome of patients receiving in-hospital medical emergency team critical care: experience from Austria's largest medical center.

Sheikh Rezaei S(1), Gatterer C(2), Sulzgruber P(2), Hofer F(2), Mittlboeck H(1), Gavrilovic S(2), Loyoddin Y(2), Wolzt M(1), Schönbauer R(2), Speidl W(2), Richter B(2), Heinz G(3), Sponder M(2).

ABSTRACT

AIM: We aimed to investigate predictors for long-term survival of in-hospital patients with medical emergency team (MET) consultation with or without in-hospital cardiac arrest (IHCA) in Austria's largest medical center. METHODS: Data of patients, who needed an intervention of a MET between 01/2014 and 03/2020 were reviewed for this retrospective analysis. RESULTS: In total, 708 MET calls were analyzed. The minimum follow-up was 7 months, the maximum 6.2 years. The main MET indications were circulatory failure (63%) followed by respiratory failure (27.1%), and bleeding events (3.5%). IHCA with subsequent cardiopulmonary resuscitation (CPR) was experienced by 425 (60%) patients. Of those, 274 (64%) reached return of spontaneous circulation (ROSC), and 221 (52%) survived the first 24-hours (median survival: 146 days) and 22.1% the first year. After adjustment for potential confounders, age ($p<0.001$), time to ROSC ($p<0.001$), a non-shockable rhythm ($p=0.041$), chronic kidney disease (CKD, $p=0.041$), peak lactate levels ($p<0.001$), and C-reactive protein ($p=0.001$) were associated with long-term all-cause mortality in IHCA patients in Cox regression analysis. The 283 MET calls (40%) which were due to other reasons than IHCA were associated with a much better 24-hours (93%) and 1-year survival (61.8%). Beside age ($p<0.001$), the main risk factors associated with mortality in MET patients without IHCA were comorbidities such as chronic obstructive pulmonary disease (COPD, $p=0.008$), CKD ($p=0.001$), pulmonary hypertension/ chronic thromboembolic pulmonary hypertension (PH/CTEPH, $p=0.024$), and cancer ($p=0.040$). CONCLUSIONS: Patients triggering MET calls have an increased mortality, especially those with IHCA. Predictors of mortality comprise age, comorbidities, and cardiac arrest-related parameters. A better characterization of MET call populations and their outcome might help to improve clinical decision making.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Braz J Cardiovasc Surg. 2022 Oct 18. doi: 10.21470/1678-9741-2021-0354. Online ahead of print.

Surgical Management of Massive Pulmonary Embolism Presenting with Cardiopulmonary Arrest: How Far Is Too Far?

Rathore K(1), Newman M(2).

ABSTRACT

The incidence of diagnosed massive pulmonary embolism presenting to the Emergency Department is between 3% and 4.5% and it is associated with high mortality if not intervened timely. Cardiopulmonary arrest in this subset of patients carries a very poor prognosis, and various treating pathways have been applied with modest rate of success. Systemic thrombolysis is an established first line of treatment, but surgeons are often involved in the decision-making because of the improving surgical pulmonary embolectomy outcomes.

2. Europace. 2022 Oct 18;euac172. doi: 10.1093/europace/euac172. Online ahead of print.

Sports-related sudden cardiac arrest in young adults.

Bohm P(1)(2), Meyer T(1), Narayanan K(3)(4), Schindler M(2), Weizman O(3), Beganton F(3), Schmied C(2), Bougouin W(3)(5), Barra S(3)(6), Dumas F(3)(5)(7), Varenne O(3)(5)(8), Cariou A(3)(5)(9), Karam N(3)(10)(11), Jouven X(3)(10)(11), Marijon E(3)(10)(11).

ABSTRACT

AIMS: Data on sports-related sudden cardiac arrest (SrSCA) among young adults in the general population are scarce. We aimed to determine the overall SrSCA incidence, characteristics, and outcomes in young adults. METHODS AND RESULTS: Prospective cohort study of all cases of SrSCA between 2012 and 2019 in Germany and Paris area, France, involving subjects aged 18-35 years. Detection of SrSCA was achieved via multiple sources, including emergency medical services (EMS) reporting and web-based screening of media releases. Cases and aetiologies were centrally adjudicated. Overall, a total of 147 SrSCA (mean age 28.1 ± 4.8 years, 95.2% males) occurred, with an overall burden of 4.77 [95% confidence interval (CI) 2.85-6.68] cases per million-year, including 12 (8.2%) cases in young competitive athletes. While bystander cardiopulmonary resuscitation (CPR) was initiated in 114 (82.6%), automated external defibrillator (AED) use by bystanders occurred only in a minority (7.5%). Public AED use prior to EMS arrival (odds ratio 6.25, 95% CI 1.48-43.20, $P = 0.02$) was the strongest independent predictor of survival at hospital discharge (38.1%). Among cases that benefited from both immediate bystander CPR and AED use, survival rate was 90.9%. Coronary artery disease was the most frequent aetiology (25.8%), mainly through acute coronary syndrome (86.9%). CONCLUSION: Sports-related sudden cardiac arrest in the young occurs mainly in recreational male sports participants. Public AED use remains disappointingly low, although survival may reach 90% among those who benefit from both bystander CPR and early defibrillation. Coronary artery disease is the most prevalent cause of SrSCA in young adults.

3. Int J Cardiol. 2022 Dec 15;369:19-20. doi: 10.1016/j.ijcard.2022.08.006. Epub 2022 Aug 4.

Arrhythmic mitral annular disjunction syndrome: An underestimated cause of sudden cardiac death.

Yeerken M(1), Wen Y(2), Lv H(1), Tang B(3), Lu Y(4).

NO ABSTRACT AVAILABLE

4. Europace. 2022 Oct 13;24(10):1599-1607. doi: 10.1093/europace/euac032.

Nationwide study of mortality and sudden cardiac death in young persons diagnosed with chronic kidney disease.

Svane J(1)(2), Nielsen JL(1), Stampe NK(1), Feldt-Rasmussen B(3), Garcia R(1)(4), Risgaard B(1), Gislason GH(5)(6)(7), Winkel BG(1), Lynge TH(1), Tfelt-Hansen J(1)(2).

ABSTRACT

AIMS: The aim of this study was to compare short- and long-term risk of sudden cardiac death (SCD) among persons aged 18-49 years with and without chronic kidney disease (CKD). METHODS AND RESULTS: Using Danish nationwide health registries, all persons aged 18-49 years diagnosed with earlier stages of CKD or chronic kidney failure from 1 July 1995 through 2009 were identified. Non-exposed subjects matched on sex and birth-year were identified. All SCD in the Danish population aged 18-49 years in 2000-2009 have previously been identified using information from the Danish nationwide health registries, death certificates, and autopsy reports. In total, 9308 incident cases of earlier stage CKD and 1233 incident cases of chronic kidney failure were included. Among patients with earlier stage CKD, the absolute risk of SCD 1, 5, and 10 years after diagnosis was 0.14%, 0.37%, and 0.68%, respectively. Compared with age- and sex-matched subjects the corresponding relative

risk (RR) was 20.3 [95% confidence interval (CI) 8.4-48.8], 7.1 (95% CI 4.2-12.0), and 6.1 (95% CI 3.8-9.7), respectively. Among patients with chronic kidney failure, the absolute 1-, 5-, and 10-year risk of SCD was 0.17%, 0.56%, and 2.07%, respectively. The corresponding RR was 12.5 (95% CI 1.4-111.6), 7.9 (95% CI 2.3-27.0), and 10.1 (95% CI 4.5-22.6). **CONCLUSION:** Persons with earlier stage CKD and chronic kidney failure had increased risk of SCD compared with the background population with a 6- to 20-fold increased risk of SCD. These findings underline the importance of early cardiovascular risk monitoring and assessment in persons with CKD.

END-TIDAL CO₂

1. Resuscitation. 2022 Oct 14:S0300-9572(22)00680-3. doi: 10.1016/j.resuscitation.2022.10.001. Online ahead of print.

Increase in End-Tidal Carbon Dioxide after Defibrillation Predicts Sustained Return of Spontaneous Circulation During Out-of-Hospital Cardiac Arrest.

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

ABSTRACT

INTRODUCTION: Guidelines recommend monitoring end-tidal carbon dioxide (ETCO₂) during out-of-hospital cardiac arrest (OHCA), though its prognostic value is poorly understood. This study investigated the relationship between ETCO₂ and return of spontaneous circulation (ROSC) after defibrillation in intubated non-traumatic OHCA patients. **METHODS:** This retrospective, observational cohort analysis included adult OHCA patients who received a defibrillation shock during treatment by an urban EMS agency from 2015-2021. Peak ETCO₂ values were determined for the 90-second periods before and after the first defibrillation in an intubated patient (shock of interest [SOI]). Values were analyzed for association between the change in ETCO₂ from pre- to post-shock and the presence of ROSC on the subsequent pulse check. **RESULTS:** Of 518 eligible patients, mean age was 61, 72% were male, 50% had a bystander-witnessed arrest, and 62% had at least one episode of ROSC. The most common arrest etiology was medical (92%). Among all patients, peak ETCO₂ during resuscitation prior to SOI was 36.8 mmHg (18.6). ETCO₂ increased in patients who achieved ROSC immediately after SOI (from 38.3 to 47.6 mmHg; +9.3 CI: 6.5, 12.1); patients with sustained ROSC experienced the greatest increase in ETCO₂ after SOI (from 37.8 to 48.2 mmHg; +10.4 CI: 7.2, 13.6), while ETCO₂ in patients who did not achieve ROSC after SOI rose (from 36.4 to 37.8 mmHg; +1.4 CI: -0.1, 2.8). **CONCLUSIONS:** ETCO₂ rises after defibrillation in most patients during cardiac arrest. Patients with sustained ROSC experience larger rises, though the majority experience rises of less than 10 mmHg.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

1. Prehosp Disaster Med. 2022 Oct 21:1-4. doi: 10.1017/S1049023X22001418. Online ahead of print.
Temporal Changes in Epinephrine Dosing in Out-of-Hospital Cardiac Arrest: A Review of EMS Protocols across the United States.

Garfinkel E(1), Michelsen K(2), Johnson B(1), Margolis A(1), Levy M(1).

ABSTRACT

BACKGROUND: Administration of epinephrine has been associated with worse neurological outcomes for survivors of out-of-hospital cardiac arrest. The publication of the 2018 PARAMEDIC-2 trial, a randomized and double-blind study of epinephrine in out-of-hospital cardiac arrest, provides the strongest evidence to date that epinephrine increases return of spontaneous circulation (ROSC) but not neurologically intact survival. This study aims to determine if Emergency Medical Services (EMS) cardiac arrest protocols have changed since the publication of PARAMEDIC-2. **METHODS:** States in the US utilizing mandatory or model state-wide EMS protocols, including Washington DC, were included in this study. The nontraumatic cardiac arrest protocol as of January 1, 2018 was compared to the protocol in effect on January 1, 2021 to determine if there was a change in the administration of epinephrine. Protocols were downloaded from the relevant state EMS website. If a protocol could not be obtained, the state medical director was contacted. **RESULTS:** A 2021 state-wide protocol was found for 32/51 (62.7%) states. Data from 2018 were available for 21/51 (41.2%) states. Of the 11 states without data from 2018, all follow Advanced Cardiac Life Support (ACLS) guidelines in the 2021 protocol. Five (15.6%) of the states with a state-wide protocol made a change in the cardiac arrest protocols. Maximum cumulative epinephrine dose was limited to 4mg in Maryland and 3mg in Vermont. Rhode Island changed epinephrine in shockable rhythms to be administered after three cycles of cardiopulmonary resuscitation (CPR) and an anti-arrhythmic. Rhode Island also added an epinephrine infusion as an option. No states removed epinephrine administration from their cardiac arrest protocol. Simple statistical analysis was performed with Microsoft Excel. **CONCLUSION:** Several states have adjusted cardiac arrest protocols since 2018. The most frequent change was limiting the maximum cumulative dosage of epinephrine. One state changed timing of epinephrine dosing depending on the rhythm and also provided an option of an epinephrine infusion in place of bolus dosing. While the sample size is small, these changes may reflect the future direction of prehospital cardiac arrest protocols. Significant limitations apply, including the exclusion of local and regional protocols which are more capable of quickly adjusting to new research. Additionally, this study is only focused on EMS in the United States.

2. Front Pharmacol. 2022 Sep 30;13:930245. doi: 10.3389/fphar.2022.930245. eCollection 2022.

The first case series analysis on efficacy of esmolol injection for in-hospital cardiac arrest patients with refractory shockable rhythms in China.

Lian R(1), Zhang G(2), Yan S(1), Sun L(1), Gao W(1), Yang J(1), Li G(1), Huang R(3), Wang X(3), Liu R(4), Cao G(5), Wang Y(6), Zhang G(1).

ABSTRACT

Background: This study assessed the effects of esmolol injection in patients with in-hospital cardiac arrest (IHCA) with refractory ventricular fibrillation (VF)/pulseless ventricular tachycardia (pVT). **Methods:** From January 2018 to December 2021, 29 patients with IHCA with refractory shockable rhythm were retrospectively reviewed. Esmolol was administered after advanced cardiovascular life support (ACLS)-directed procedures, and outcomes were assessed. **Results:** Among the 29 cases, the rates of sustained return of spontaneous circulation (ROSC), 24-h ROSC, and 72-h ROSC were 79%, 62%, and 59%, respectively. Of those patients, 59% ultimately survived to discharge. Four patients with cardiac insufficiency died. The duration from CA to esmolol infusion was significantly shorter for patients in the survival group (SG) than for patients in the dead group (DG) (12 min, IQR: 8.5-19.5 vs. 23.5 min, IQR: 14.4-27 min; $p = 0.013$). Of those patients, 76% (22 of 29) started esmolol

administration after the second dose of amiodarone. No significant difference was observed in the survival rate between this group and groups administered an esmolol bolus simultaneously or before the second dose of amiodarone (43% vs. 64%, $p = 0.403$). Of those patients, 31% (9 of 29) were administered an esmolol bolus for defibrillation attempts ≤ 5 , while the remaining 69% of patients received an esmolol injection after the fifth defibrillation attempt. No significant differences were observed in the rates of ≥ 24 -h ROSC (67% vs. 60%, $p = 0.73$), ≥ 72 -h ROSC (67% vs. 55%, $p = 0.56$), and survival to hospital discharge (67% vs. 55%, $p = 0.56$) between the groups administered an esmolol bolus for defibrillation attempts ≤ 5 and defibrillation attempts > 5 . Conclusion: IHCA patients with refractory shockable rhythms receiving esmolol bolus exhibited a high chance of sustained ROSC and survival to hospital discharge. Patients with end-stage heart failure tended to have attenuated benefits from beta-blockers. Further large-scale, prospective studies are necessary to determine the effects of esmolol in patients with IHCA with refractory shockable rhythms.

TRAUMA

1. Scand J Trauma Resusc Emerg Med. 2022 Oct 17;30(1):54. doi: 10.1186/s13049-022-01039-9.

Characteristics and outcome of traumatic cardiac arrest at a level 1 trauma centre over 10 years in Sweden.

Ohlén D(1)(2), Hedberg M(3)(4), Martinsson P(5), von Oelreich E(3)(4), Djärv T(5)(6), Jonsson Fagerlund M(3)(4).

ABSTRACT

BACKGROUND: Historically, resuscitation in traumatic cardiac arrest (TCA) has been deemed futile. However, recent literature reports improved but varying survival. Current European guidelines emphasise the addressing of reversible aetiologies in TCA and propose that a resuscitative thoracotomy may be performed within 15 min from last sign of life. To improve clinician understanding of which patients benefit from resuscitative efforts we aimed to describe the characteristics and 30-day survival for traumatic cardiac arrest at a Swedish trauma centre with a particular focus on resuscitative thoracotomy. METHODS: Retrospective cohort study of adult patients (≥ 15 years) with TCA managed at Karolinska University Hospital Solna between 2011 and 2020. Trauma demographics, intra-arrest factors, lab values and procedures were compared between survivors and non-survivors. RESULTS: Among the 284 included patients the median age was 38 years, 82.2% were male and 60.5% were previously healthy. Blunt trauma was the dominant injury in 64.8% and median Injury Severity Score (ISS) was 38. For patients with a documented arrest rhythm, asystole was recorded in 39.2%, pulseless electric activity in 24.8% and a shockable rhythm in 6.8%. Thirty patients (10.6%) survived to 30 days with a Glasgow Outcome Scale score of 3 ($n = 23$) or 4 ($n = 7$). The most common causes of death were haemorrhagic shock (50.0%) and traumatic brain injury (25.5%). Survivors had a lower ISS ($P < 0.001$), more often had reactive pupils ($P < 0.001$) and a shockable rhythm ($P = 0.04$). In the subset of prehospital TCA, survivors less frequently received adrenaline (epinephrine) ($P < 0.001$) and in lower amounts ($P = 0.02$). Of patients that underwent resuscitative thoracotomy ($n = 101$), survivors ($n = 12$) had a shorter median time from last sign of life to thoracotomy ($P = 0.03$), however in four of these survivors the time exceeded 15 min. CONCLUSION: Survival after TCA is possible. Determining futility in TCA is difficult and this study demonstrates survivors outside of recent guidelines.

VENTILATION

1. Intern Emerg Med. 2022 Oct 19. doi: 10.1007/s11739-022-03120-8. Online ahead of print.

Risk factors for failed first intubation attempt in an out-of-hospital setting: a multicenter prospective study.

Galinski M(1)(2), Wrobel M(3), Boyer R(4), Reuter PG(5)(6), Ruscev M(7), Debaty G(8), Bagou G(9), Dehours E(10), Bosc J(11), Lorendeau JP(12), Goddet S(13), Marouf K(14), Catoire P(4)(15), Combes X(4)(15), Simonnet B(4), Gil-Jardiné C(4)(15).

ABSTRACT

This study was performed to identify variables potentially associated with failure of the first intubation attempt in an out-of-hospital emergency setting, considering all aspects of tracheal intubation. This observational prospective multicenter study was performed over 17 months and involved 10 prehospital emergency medical units. After each tracheal intubation, the operator was required to provide information concerning operator and patient characteristics, as well as the environmental conditions during intubation, by completing a data collection form. The primary endpoint was failure of the first intubation attempt. During the study period, 1546 patients were analyzed, of whom 59% were in cardiac arrest; 486 intubations failed on the first attempt (31.4% [95% confidence interval = 30.2-32.6]). Multivariate analysis revealed that the following 7 of 28 factors were associated with an increased risk of a failed first intubation attempt: operator with fewer than 50 prior intubations (odds ratio [OR] = 1.8 [1.4-2.4]), small inter-incisor space (OR = 2.3 [1.7-3.2]), limited extension of the head (OR = 1.6 [1.1-2.1]), macroglossia (OR = 2.3 [1.6-3.2]), ear/nose/throat (ENT) tumor (OR = 4.4 [1.4-13.4]), cardiac arrest (OR = 1.8 [1.3-2.6]), and vomiting (OR = 1.7 [1.3-2.3]). The frequency of adverse events among non-cardiac arrest patients was 17.6%; it increased with each additional intubation attempt. The first intubation attempt failed in more than 30% of cases, and seven variables were associated with increased risk of failure. Most of these factors could not be predicted.

CEREBRAL MONITORING

1. Neuroradiology. 2022 Oct 17. doi: 10.1007/s00234-022-03063-z. Online ahead of print.

Comparison of the prognostic value of early-phase proton magnetic resonance spectroscopy and diffusion tensor imaging with serum neuron-specific enolase at 72 h in comatose survivors of out-of-hospital cardiac arrest-a substudy of the XeHypotheca trial.

Koskensalo K(#)(1)(2), Virtanen S(#)(3), Saunavaara J(2), Parkkola R(3), Laitio R(4), Arola O(4), Hynninen M(5), Silvasti P(5), Nukarinen E(5), Martola J(6), Silvennoinen HM(6), Tiainen M(7), Roine RO(8), Scheinin H(4), Saraste A(9), Maze M(10), Vahlberg T(11), Laitio TT(12); XeHYPOTHECA Research Group.

ABSTRACT

PURPOSE: We compared the predictive accuracy of early-phase brain diffusion tensor imaging (DTI), proton magnetic resonance spectroscopy (1H-MRS), and serum neuron-specific enolase (NSE) against the motor score and epileptic seizures (ES) for poor neurological outcome after out-of-hospital cardiac arrest (OHCA). **METHODS:** The predictive accuracy of DTI, 1H-MRS, and NSE along with motor score at 72 h and ES for the poor neurological outcome (modified Rankin Scale, mRS, 3 - 6) in 92 comatose OHCA patients at 6 months was assessed by area under the receiver operating characteristic curve (AUROC). Combined models of the variables were included as exploratory. **RESULTS:** The predictive accuracy of fractional anisotropy (FA) of DTI (AUROC 0.73, 95% CI 0.62-0.84), total N-acetyl aspartate/total creatine (tNAA/tCr) of 1H-MRS (0.78 (0.68 - 0.88)), or NSE at 72 h (0.85 (0.76 - 0.93)) was not significantly better than motor score at 72 h (0.88 (95% CI 0.80-0.96)). The addition of FA and tNAA/tCr to a combination of NSE, motor score, and ES provided a small but statistically significant improvement in predictive accuracy (AUROC 0.92 (0.85-0.98) vs 0.98 (0.96-1.00), $p = 0.037$). **CONCLUSION:** None of the variables (FA, tNAA/tCr, ES, NSE at 72 h, and motor score at 72 h) differed significantly in predicting poor outcomes in this patient group. Early-

phase quantitative neuroimaging provided a statistically significant improvement for the predictive value when combined with ES and motor score with or without NSE. However, in clinical practice, the additional value is small, and considering the costs and challenges of imaging in this patient group, early-phase DTI/MRS cannot be recommended for routine use.

2. Crit Care Med. 2022 Nov 1;50(11):e791-e792. doi: 10.1097/CCM.0000000000005617. Epub 2022 Oct 13.

Neurologic Recovery in Men Versus Women Possibly Due to Reduced Return of Spontaneous Circulation: Beware of Potential Confounders!

Honore PM(1), Redant S(1), Djimafo P(1), Blackman S(2), Preseau T(3), Cismas BV(3), Kaefer K(1), Barreto Gutierrez L(1), Anane S(1), Gallerani A(1), Attou R(1).

NO ABSTRACT AVAILABLE

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. PLoS One. 2022 Oct 21;17(10):e0276574. doi: 10.1371/journal.pone.0276574. eCollection 2022.

Bystander-witnessed cardiopulmonary resuscitation by nonfamily is associated with neurologically favorable survival after out-of-hospital cardiac arrest in Miyazaki City District.

Tsuruda T(1), Hamahata T(2), Endo GJ(3)(4), Tsuruda Y(5), Kaikita K(6).

ABSTRACT

BACKGROUND: Bystander intervention in cases of out-of-hospital cardiac arrest (OHCA) is a key factor in bridging the gap between the event and the arrival of emergency health services at the site. This study investigated the implementation rate of bystander cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) and 1-month survival after OHCA in Miyazaki prefecture and Miyazaki city district as well as compared them with those of eight prefectures in the Kyushu-Okinawa region in Japan. In addition, we analyzed prehospital factors associated with survival outcomes in Miyazaki city district. **METHODS:** We used data from an annual report released by the Fire and Disaster Management Agency of Japan (n = 627,982) and the Utstein reporting database in Miyazaki city district (n = 1,686) from 2015 to 2019. **RESULT:** Despite having the highest rate of bystander CPR (20.8%), the 1-month survival rate (15.7%) of witnessed OHCA cases of cardiac causes in Miyazaki city district was comparable with that in the eight prefectures between 2015 and 2019. However, rates of survival (10.7%) in Miyazaki prefecture were lower than those in other prefectures. In 1,686 patients with OHCA (74 ± 18 years old, 59% male) from the Utstein reporting database identical to the 5-year study period in Miyazaki city district, binary logistic regression analysis demonstrated that age of the recipient [odds ratio (OR) 0.979, 95% confidential interval (CI) 0.964-0.993, p = 0.004], witness of the arrest event (OR 7.501, 95% CI 3.229-17.428, p < 0.001), AED implementation (OR 14.852, 95% CI 4.226-52.201, p < 0.001), and return of spontaneous circulation (ROSC) before transport (OR 31.070, 95% CI 16.585-58.208, p < 0.001) predicted the 1-month survival with favorable neurological outcomes. In addition, chest compression at a public place (p < 0.001) and by nonfamily members (p < 0.001) were associated with favorable outcomes (p = 0.015). **CONCLUSIONS:** We found differences in 1-month survival rates after OHCA in the Kyushu-Okinawa region of Japan. Our results suggest that on-field ROSC with defibrillation performed by nonfamily bystanders who witnessed the event determines 1-month neurological outcomes after OHCA in

Miyazaki city district. Continued education of citizens on CPR techniques and better access to AED devices may improve outcomes.

2. *Ann Med Surg (Lond)*. 2022 Sep 22;82:104588. doi: 10.1016/j.amsu.2022.104588. eCollection 2022 Oct.

Knowledge, attitude, and practice towards basic life support among graduating class health science and medical students at Dilla University; a cross sectional study.

Tadesse M(1), Assen Seid S(1), Getachew H(1), Ali SA(1).

ABSTRACT

INTRODUCTION: Basic Life Support is a level of medical care Applied to victims of life-threatening illnesses and injuries before professional help is provided. This study aimed to assess the knowledge, attitude, and practice toward Basic Life support in Graduating class of health science and medical students at Dilla university referral hospital. **METHOD:** ology: A cross-sectional study was conducted on graduating class students of Dilla University, college of medicine and health science from September 10/2021 to December 13/2021. A total of 167 participants were selected by a systematic random sampling technique. A bi-variable and multi-variable logistic regression analysis were carried out. **RESULT:** Among the study participants, 95 (56.9%) and 86(51.5%) have good knowledge and good practice towards basic life support respectively. Being trained for basic life support and advanced life support, exposure with the person in need of basic life support were found more knowledgeable with odd ratio of [AOR = 13.8, 95% CI (6.3-30.1)], [AOR = 27.7, 95% CI (6.4-119)] and [AOR = 15.7, 95% CI (6.6-37.5)]. Learning anesthesia increases knowledge about basic life support nearly two times [AOR = 1.8, 95% CI (0.4-9.5)] when compared to medicine. **CONCLUSION:** The findings of this study suggest that nearly half of health science students in our hospital lack adequate knowledge and skills in BLS. Training on basic life support and advanced life support, learning in anesthesia and medicine departments, and exposure to the person in need of basic life support were significantly associated with high knowledge. To increase knowledge of BLS standardized Training and assessments are recommended.

3. *Am J Emerg Med*. 2022 Sep 30;62:41-48. doi: 10.1016/j.ajem.2022.09.035. Online ahead of print.

Identification of out-of-hospital cardiac arrest clusters using unsupervised learning.

Moon HJ(1), Shin YJ(2), Cho YS(3).

ABSTRACT

AIM: Out-of-hospital cardiac arrest (OHCA) is a leading cause of death, and research has identified limitations in analyzing the factors related to the incidence of cardiac arrest and the frequency of bystander cardiopulmonary resuscitation. This study conducts a cluster analysis of the correlation between location-related factors and the outcome of patients with OHCA using two machine learning methods: variational autoencoder (VAE) and the Dirichlet process mixture model (DPMM). **METHODS:** Using the prospectively collected Smart Advanced Life Support registry in South Korea between August 2015 and December 2018, a secondary retrospective data analysis was performed on patients with OHCA with a presumed cause of cardiac arrest in adults of 18 years or older. VAE and DPMM were used to create clusters to determine groups with a common nature among those with OHCA. **RESULTS:** Among 5876 OHCA cases, 1510 patients were enrolled in the final analysis. Decision tree-based models, which have an accuracy of 95.36%, were also used to interpret the characteristics of clusters. A total of 8 clusters that had similar spatial characteristics were identified using DPMM and VAE. Among the generated clusters, the averages of the four clusters that exhibited a high survival to discharge rate and a favorable neurological outcome were 9.6% and 6.1%, and the averages of the four clusters that exhibited a low outcome were 5.1% and 3.5% respectively. In the decision tree-based models, the most important feature that could affect the

prognosis of an OHCA patient was being transferred to a higher-level emergency center.

CONCLUSION: This methodology can facilitate the development of a regionalization strategy that can improve the survival rate of cardiac arrest patients in different regions.

4. Eur Heart J Qual Care Clin Outcomes. 2022 Oct 15:qcac066. doi: 10.1093/ehjqcco/qcac066. Online ahead of print.

Fifteen-year secular changes in the care and outcomes of patients with out-of-hospital cardiac arrest in Japan: A nationwide, population-based study.

Shibahashi K(1), Kato T(1), Hikone M(1), Sugiyama K(1).

ABSTRACT

AIMS: Countries have implemented initiatives to improve the outcomes of patients with out-of-hospital cardiac arrest (OHCA). However, secular changes in care and outcomes at the national level have not been extensively investigated. This study aimed to determine 15-year secular changes in the outcomes of such patients in Japan. **METHODS AND RESULTS:** Using population-based data of patients with OHCA, covering all populations in Japan (2005-2019), patients for whom resuscitation was attempted were identified. The primary outcome was a favourable neurological outcome (Cerebral Performance Category 1 or 2: sufficient cerebral function for independent activities of daily life and work in a sheltered environment). Secular changes in outcomes were determined using a mixed-level multivariate logistic regression analysis. Overall, 1,764,440 patients (42.4% women; median age, 78 years) were examined. The incidence, median age, and proportion of patients who received bystander cardiopulmonary resuscitation and dispatcher instructions for resuscitation increased significantly during the study period ($p < 0.001$). A significant trend was noted toward improved outcomes over time (P for trend < 0.001); favourable neurological outcome proportions 1 month after arrest increased from 1.7% to 3.0% (odds ratio, 1.03 per 1-incremental year). A remarkable increase was noted in favourable neurological outcomes in younger patients and patients with initial shockable cardiac rhythm, while improvement varied among prefectures. **CONCLUSIONS:** In Japan, collaborative efforts have yielded commendable achievements in the care and outcomes of patients with OHCA over 15 years through to 2019, while the improvement depended on patient characteristics. Further initiatives are needed to improve OHCA outcomes.

5. Resuscitation. 2022 Oct 19:S0300-9572(22)00689-X. doi: 10.1016/j.resuscitation.2022.10.009. Online ahead of print.

Decoding Code Status After Cardiac Arrest.

Fernandez Hernandez S(1), Agarwal S(2).

NO ABSTRACT AVAILABLE

6. J Obstet Gynaecol Res. 2022 Oct 18. doi: 10.1111/jog.15466. Online ahead of print.

Maternal cardiopulmonary resuscitation.

Tanaka H(1), Matsunaga S(1), Furuta M(1), Kato R(1), Takahashi S(1), Takeda J(1), Nakao M(1), Nakamura E(1), Nii M(1), Yamashita T(1), Yamahata Y(1), Enomoto N(1), Tsuji M(1), Baba S(1), Hosokawa Y(1), Maenaka T(1), Sakurai A(1).

ABSTRACT

The perinatal resuscitation history in Japan is short, with the earliest efforts in the field of neonatology. In contrast, the standardization and dissemination of maternal resuscitation is lagging. With the establishment of the Maternal Death Reporting Project and the Maternal Death Case Review and Evaluation Committee in 2010, with the aim of reducing maternal deaths, the true situation of maternal deaths came to light. Subsequently, in 2015, the Japan Council for the Dissemination of Maternal Emergency Life Support Systems (J-CIMELS) was established to educate

and disseminate simulations in maternal emergency care; training sessions on maternal resuscitation are now conducted in all prefectures. Since the launch of the project and council, the maternal mortality rate in Japan (especially due to obstetric critical hemorrhage) has gradually decreased. This has been probably achieved due to the tireless efforts of medical personnel involved in perinatal care, as well as the various activities conducted so far. However, there are no standardized guidelines for maternal resuscitation yet. Therefore, a committee was set up within the Japan Resuscitation Council to develop a maternal resuscitation protocol, and the Guidelines for Maternal Resuscitation 2020 was created in 2021. These guidelines are expected to make the use of high-quality resuscitation methods more widespread than ever before. This presentation will provide an overview of the Guidelines for Maternal Resuscitation 2020.

POST-CARDIAC ARREST TREATMENTS

1. Resuscitation. 2022 Oct 19:S0300-9572(22)00690-6. doi: 10.1016/j.resuscitation.2022.10.011. Online ahead of print.

Association of Prehospital Post-Resuscitation Peripheral Oxygen Saturation with Survival Following Out-of-Hospital Cardiac Arrest.

Smida T(1), Menegazzi JJ(2), Crowe RP(3), Bardes J(4), Scheidler JF(4), Salcido DD(2).

ABSTRACT

BACKGROUND: Hypoxia and hyperoxia following resuscitation from out-of-hospital cardiac arrest (OHCA) may cause harm by exacerbating secondary brain injury. Our objective was to retrospectively examine the association of prehospital post-ROSC hypoxia and hyperoxia with the primary outcome of survival to discharge home. **METHODS:** We utilized the 2019-2021 ESO Data Collaborative public use research datasets for this study (ESO, Austin, TX). Average prehospital SpO₂, lowest recorded prehospital SpO₂, and hypoxia dose were calculated for each patient. The association of these measures with survival was explored using multivariable logistic regression. We also evaluated the association of American Heart Association (AHA) and European Resuscitation Council (ERC) recommended post-ROSC SpO₂ target ranges with outcome. **RESULTS:** After application of exclusion criteria, 19,023 patients were included in this study. Of these, 52.3% experienced at least one episode of post-ROSC hypoxia (lowest SpO₂ <90%) and 19.6% experienced hyperoxia (average SpO₂ > 98%). In comparison to normoxic patients, patients who were hypoxic on average (AHA aOR: 0.31 [0.25, 0.38]; ERC aOR: 0.34 [0.28, 0.42]) and patients who had a hypoxic lowest recorded SpO₂ (AHA aOR: 0.48 [0.39, 0.59]; ERC aOR: 0.52 [0.42, 0.64]) had lower adjusted odds of survival. Patients who had a hyperoxic average SpO₂ (AHA aOR: 0.75 [0.59, 0.96]; ERC aOR: 0.68 [0.53, 0.88]) and patients who had a hyperoxic lowest recorded SpO₂ (AHA aOR: 0.66 [0.48, 0.92]; ERC aOR: 0.65 [0.46, 0.92]) also had lower adjusted odds of survival. **CONCLUSION:** Prehospital post-ROSC hypoxia and hyperoxia were associated with worse outcomes in this dataset.

2. Arch Cardiovasc Dis. 2022 Oct 3:S1875-2136(22)00182-6. doi: 10.1016/j.acvd.2022.06.008. Online ahead of print.

Performance of stent thrombosis and bleeding risk scores in out-of-hospital cardiac arrest due to acute coronary syndromes.

Seret G(1), Pham V(1), Laghnam D(2), Diefenbronn M(1), Brunet T(2), Varenne O(3), Dumas F(4), Cariou A(5), Picard F(6).

ABSTRACT

BACKGROUND: Patients with out-of-hospital cardiac arrest (OHCA) due to acute coronary syndromes (ACS) who undergo percutaneous coronary intervention (PCI) are at high risk of bleeding and thrombosis. While predictive bleeding and stent thrombosis risk scores have been established, their performance in patients with OHCA has not been evaluated. **METHODS:** All consecutive patients admitted for OHCA due to ACS who underwent PCI between January 2007 and December 2019 were

included. The ACTION and CRUSADE bleeding risk scores and the Dangas score for early stent thrombosis risk were calculated for each patient. A C-statistic analysis was performed to assess the performance of these scores. RESULTS: Among 386 included patients, 82 patients (21.2%) experienced severe bleeding and 30 patients (7.8%) experienced stent thrombosis. The predictive performance of the ACTION and CRUSADE bleeding risk scores for major bleeding was poor, with areas under the curve (AUCs) of 0.596 and 0.548, respectively. Likewise, the predictive performance of the Dangas stent thrombosis risk score was poor (AUC 0.513). Using multivariable analysis, prolonged low-flow (odds ratio [OR] 1.03, 95% confidence interval [CI] 1.00-1.05; P=0.025), reduced haematocrit or fibrinogen at admission (OR 0.93, 95% CI 0.88-0.98; P=0.010 and OR 0.61; 95% CI 0.41-0.89; P=0.012, respectively) and the use of glycoprotein IIb/IIIa inhibitors (OR 2.10, 95% CI 1.18-3.73; P=0.011) were independent risk factors for major bleeding. CONCLUSION: The classic bleeding and stent thrombosis risk scores have poor performance in a population of patients with ACS complicated by OHCA. Other predictive factors might be more pertinent to determine major bleeding and stent thrombosis risks in this specific population.

3. Resuscitation. 2022 Oct 17;S0300-9572(22)00688-8. doi: 10.1016/j.resuscitation.2022.10.008. Online ahead of print.

Different half-life of free haemoglobin and NSE may falsely predict poor prognosis after cardiac arrest.

Iten M(1), Schild C(2), Nagler M(2), Haenggi M(1).

NO ABSTRACT AVAILABLE

4. Eur J Med Res. 2022 Oct 17;27(1):202. doi: 10.1186/s40001-022-00836-3.

Resuscitative endovascular balloon occlusion of the aorta in civilian pre-hospital care: a systematic review of the literature.

Caicedo Y(1), Gallego LM(2), Clavijo HJ(1), Padilla-Londoño N(1), Gallego CN(2), Caicedo-Holguín I(1), Guzmán-Rodríguez M(3), Meléndez-Lugo JJ(4), García AF(2)(5)(6), Salcedo AE(2)(5)(6)(7), Parra MW(8), Rodríguez-Holguín F(5), Ordoñez CA(9)(10)(11).

ABSTRACT

BACKGROUND: Resuscitative endovascular balloon occlusion of the aorta (REBOA) is a damage control tool with a potential role in the hemodynamic resuscitation of severely ill patients in the civilian pre-hospital setting. REBOA ensures blood flow to vital organs by early proximal control of the source of bleeding. However, there is no consensus on the use of REBOA in the pre-hospital setting. This article aims to perform a systematic review of the literature about the feasibility, survival, indications, complications, and potential candidates for civilian pre-hospital REBOA. METHODS: A literature search was conducted using Medline, EMBASE, LILACS and Web of Science databases. Primary outcome variables included overall survival and feasibility. Secondary outcome variables included complications and potential candidates for endovascular occlusion. RESULTS: The search identified 8 articles. Five studies described the use of REBOA in pre-hospital settings, reporting a total of 47 patients in whom the procedure was attempted. Pre-hospital REBOA was feasible in 68-100% of trauma patients and 100% of non-traumatic patients with cardiac arrest. Survival rates and complications varied widely. Pre-hospital REBOA requires a coordinated and integrated emergency health care system with a well-trained and equipped team. The remaining three studies performed a retrospective analysis identifying 784 potential REBOA candidates. CONCLUSIONS: Pre-hospital REBOA could be a feasible intervention for a significant portion of severely ill patients in the civilian setting. However, the evidence is limited. The impact of pre-hospital REBOA should be assessed in future studies.

TARGETED TEMPERATURE MANAGEMENT

1. Crit Care. 2022 Oct 21;26(1):323. doi: 10.1186/s13054-022-04186-8.

Oxygen targets and 6-month outcome after out of hospital cardiac arrest: a pre-planned sub-analysis of the targeted hypothermia versus targeted normothermia after Out-of-Hospital Cardiac Arrest (TTM2) trial.

Robba C(#)(1)(2), Badenes R(#)(3)(4), Battaglini D(5)(6), Ball L(5)(7), Sanfilippo F(8), Brunetti I(5), Jakobsen JC(9)(10), Lilja G(11), Friberg H(12), Wendel-Garcia PD(13), Young PJ(14)(15)(16)(17), Eastwood G(16)(18), Chew MS(19), Uden J(20)(21), Thomas M(22), Joannidis M(23), Nichol A(24), Lundin A(25), Hollenberg J(26), Hammond N(27), Saxena M(28), Martin A(29), Solar M(30)(31), Taccone FS(32), Dankiewicz J(33), Nielsen N(34), Grejs AM(35)(36), Ebner F(#)(37), Pelosi P(#)(5)(7); TTM2 Trial collaborators.

ABSTRACT

BACKGROUND: Optimal oxygen targets in patients resuscitated after cardiac arrest are uncertain. The primary aim of this study was to describe the values of partial pressure of oxygen values (PaO₂) and the episodes of hypoxemia and hyperoxemia occurring within the first 72 h of mechanical ventilation in out of hospital cardiac arrest (OHCA) patients. The secondary aim was to evaluate the association of PaO₂ with patients' outcome. **METHODS:** Preplanned secondary analysis of the targeted hypothermia versus targeted normothermia after OHCA (TTM2) trial. Arterial blood gases values were collected from randomization every 4 h for the first 32 h, and then, every 8 h until day 3. Hypoxemia was defined as PaO₂ < 60 mmHg and severe hyperoxemia as PaO₂ > 300 mmHg. Mortality and poor neurological outcome (defined according to modified Rankin scale) were collected at 6 months. **RESULTS:** 1418 patients were included in the analysis. The mean age was 64 ± 14 years, and 292 patients (20.6%) were female. 24.9% of patients had at least one episode of hypoxemia, and 7.6% of patients had at least one episode of severe hyperoxemia. Both hypoxemia and hyperoxemia were independently associated with 6-month mortality, but not with poor neurological outcome. The best cutoff point associated with 6-month mortality for hypoxemia was 69 mmHg (Risk Ratio, RR = 1.009, 95% CI 0.93-1.09), and for hyperoxemia was 195 mmHg (RR = 1.006, 95% CI 0.95-1.06). The time exposure, i.e., the area under the curve (PaO₂-AUC), for hyperoxemia was significantly associated with mortality (p = 0.003). **CONCLUSIONS:** In OHCA patients, both hypoxemia and hyperoxemia are associated with 6-months mortality, with an effect mediated by the timing exposure to high values of oxygen. Precise titration of oxygen levels should be considered in this group of patients.

2. Resusc Plus. 2022 Oct 12;12:100316. doi: 10.1016/j.resplu.2022.100316. eCollection 2022 Dec.

Prognostic accuracy of head computed tomography for prediction of functional outcome after out-of-hospital cardiac arrest: Rationale and design of the prospective TTM2-CT-substudy.

Lang M(1), Leithner C(2), Scheel M(3), Kenda M(2)(4), Cronberg T(5), During J(6), Rylander C(7), Annborn M(8), Dankiewicz J(9), Deye N(10), Halliday T(11), Lascarrou JB(12), Matthew T(13), McGuigan P(14), Morgan M(15)(16)(17), Thomas M(18), Ullén S(19), Undén J(20)(21), Nielsen N(8), Moseby-Knappe M(5).

ABSTRACT

BACKGROUND: Head computed tomography (CT) is a guideline recommended method to predict functional outcome after cardiac arrest (CA), but standardized criteria for evaluation are lacking. To date, no prospective trial has systematically validated methods for diagnosing hypoxic-ischaemic encephalopathy (HIE) on CT after CA. We present a protocol for validation of pre-specified radiological criteria for assessment of HIE on CT for neuroprognostication after CA. **METHODS/DESIGN:** This is a prospective observational international multicentre substudy of the Targeted Hypothermia versus Targeted Normothermia after out-of-hospital cardiac arrest (TTM2) trial. Patients still unconscious 48 hours post-arrest at 13 participating hospitals were routinely examined with CT. Original images will be evaluated by examiners blinded to clinical data using a standardized

protocol. Qualitative assessment will include evaluation of absence/presence of "severe HIE". Radiodensities will be quantified in pre-specified regions of interest for calculation of grey-white matter ratios (GWR) at the basal ganglia level. Functional outcome will be dichotomized into good (modified Rankin Scale 0-3) and poor (modified Rankin Scale 4-6) at six months post-arrest. Prognostic accuracies for good and poor outcome will be presented as sensitivities and specificities with 95% confidence intervals (using pre-specified cut-offs for quantitative analysis), descriptive statistics (Area Under the Receiver Operating Characteristics Curve), inter- and intra-rater reliabilities according to STARD guidelines. CONCLUSIONS: The results from this prospective trial will validate a standardized approach to radiological evaluations of HIE on CT for prediction of functional outcome in comatose CA patients. The TTM2 trial and the TTM2 CT substudy are registered at ClinicalTrials.gov NCT02908308 and NCT03913065.

3. Neurotherapeutics. 2022 Oct 17. doi: 10.1007/s13311-022-01315-7. Online ahead of print.

Through the Looking Glass: The Paradoxical Evolution of Targeted Temperature Management for Comatose Survivors of Cardiac Arrest.

D'Amato SA(1), Kimberly WT(2), Mayer SA(3).

ABSTRACT

For the past two decades, targeted temperature management (TTM) has been a staple in the care of comatose survivors following cardiac arrest. However, recent clinical trials have failed to replicate the benefit seen in earlier studies, bringing into question the very existence of such clinical practice. In this review, we explore clinical scenarios within critical care that appeared to share a similar fate, but in actuality changed the landscape of practice in a modern world. Accordingly, clinicians may apply these lessons to the utilization of TTM among comatose survivors following cardiac arrest, potentially paving way for a re-framing of clinical care amidst an environment where current data appears upside down in comparison to past successes.

4. Ann Intensive Care. 2022 Oct 17;12(1):96. doi: 10.1186/s13613-022-01071-z.

Outcomes of mild-to-moderate postresuscitation shock after non-shockable cardiac arrest and association with temperature management: a post hoc analysis of HYPERION trial data.

Ziriat I(1), Le Thuaut A(2), Colin G(3)(4), Merdji H(5)(6), Grillet G(7), Girardie P(8)(9), Souweine B(10), Dequin PF(11)(12)(13), Boulain T(14), Frat JP(15)(16)(17), Asfar P(18), Francois B(19)(20), Landais M(21), Plantefevre G(22), Quenot JP(23), Chakarian JC(24), Sirodot M(25), Legriel S(4)(26), Massart N(27), Thevenin D(28), Desachy A(29), Delahaye A(30), Botoc V(31), Vimeux S(32), Martino F(33), Reignier J(1), Cariou A(4)(34)(35), Lascarrou JB(36)(37)(38)(39).

ABSTRACT

BACKGROUND: Outcomes of postresuscitation shock after cardiac arrest can be affected by targeted temperature management (TTM). A post hoc analysis of the "TTM1 trial" suggested higher mortality with hypothermia at 33 °C. We performed a post hoc analysis of HYPERION trial data to assess potential associations linking postresuscitation shock after non-shockable cardiac arrest to hypothermia at 33 °C on favourable functional outcome. **METHODS:** We divided the patients into groups with vs. without postresuscitation (defined as the need for vasoactive drugs) shock then assessed the proportion of patients with a favourable functional outcome (day-90 Cerebral Performance Category [CPC] 1 or 2) after hypothermia (33 °C) vs. controlled normothermia (37 °C) in each group. Patients with norepinephrine or epinephrine > 1 µg/kg/min were not included. **RESULTS:** Of the 581 patients included in 25 ICUs in France and who did not withdraw consent, 339 had a postresuscitation shock and 242 did not. In the postresuscitation-shock group, 159 received hypothermia, including 14 with a day-90 CPC of 1-2, and 180 normothermia, including 10 with a day-90 CPC of 1-2 (8.81% vs. 5.56%, respectively; P = 0.24). After adjustment, the proportion of patients

with CPC 1-2 also did not differ significantly between the hypothermia and normothermia groups (adjusted hazards ratio, 1.99; 95% confidence interval, 0.72-5.50; P = 0.18). Day-90 mortality was comparable in these two groups (83% vs. 86%, respectively; P = 0.43). CONCLUSIONS: After non-shockable cardiac arrest, mild-to-moderate postresuscitation shock at intensive-care-unit admission did not seem associated with day-90 functional outcome or survival. Therapeutic hypothermia at 33 °C was not associated with worse outcomes compared to controlled normothermia in patients with postresuscitation shock.

5. Am J Health Syst Pharm. 2022 Oct 21:zxac307. doi: 10.1093/ajhp/zxac307. Online ahead of print.

Electrolyte considerations in targeted temperature management.

Barlow B(1), Landolf K(2), LaPlante R(3), Cercone J(3), Kim JY(2), Ghorashi S(2), Howell A(2), Armahizer M(3), Heavner MS(2).

ABSTRACT

DISCLAIMER: In an effort to expedite the publication of articles, AJHP is posting manuscripts online as soon as possible after acceptance. Accepted manuscripts have been peer-reviewed and copyedited, but are posted online before technical formatting and author proofing. These manuscripts are not the final version of record and will be replaced with the final article (formatted per AJHP style and proofed by the authors) at a later time. PURPOSE: Targeted temperature management (TTM), including normothermia and therapeutic hypothermia, is used primarily for comatose patients with return of spontaneous circulation after cardiac arrest or following neurological injury. Despite the potential benefits of TTM, risks associated with physiological alterations, including electrolyte shifts, may require intervention. SUMMARY: This review describes the normal physiological balance of electrolytes and temperature-related alterations as well as the impact of derangements on patient outcomes, providing general recommendations for repletion and monitoring of key electrolytes, including potassium, phosphate, and magnesium. CONCLUSION: Frequent monitoring and consideration of patient variables such as renal function and other risk factors for adverse effects are important areas of awareness for clinicians caring for patients undergoing TTM.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

No articles identified.

PEDIATRICS AND CHILDREN

No articles identified.

EXTRACORPOREAL LIFE SUPPORT

No articles identified.

EXPERIMENTAL RESEARCH

1. Cell Mol Neurobiol. 2022 Oct 20. doi: 10.1007/s10571-022-01296-3. Online ahead of print.

Neuroprotective Effect of miR-483-5p Against Cardiac Arrest-Induced Mitochondrial Dysfunction Mediated Through the TNFSF8/AMPK/JNK Signaling Pathway.

Zhang Q(#)(1)(2), Zhan H(#)(3)(2), Liu C(1)(2), Zhang C(3)(2), Wei H(3), Li B(1), Zhou D(1), Lu Y(1), Huang S(1), Cheng J(1), Li S(3), Wang C(1), Hu C(4), Liao X(5).

ABSTRACT

Substantial morbidity and mortality are associated with postcardiac arrest brain injury (PCABI). MicroRNAs(miRNAs) are essential regulators of neuronal metabolism processes and have been shown to contribute to alleviated neurological injury after cardiac arrest. In this study, we identified miRNAs related to the prognosis of patients with neurological dysfunction after cardiopulmonary resuscitation based on data obtained from the Gene Expression Omnibus (GEO) database. Then, we explored the effects of miR-483-5p on mitochondrial biogenesis, mitochondrial-dependent apoptosis, and oxidative stress levels after ischemia–reperfusion injury in vitro and in vivo. MiR-483-5p was downregulated in PC12 cells and hippocampal samples compared with that in normal group cells and hippocampi. Overexpression of miR-483-5p increased the viability of PC12 cells after ischemia–reperfusion injury and reduced the proportion of dead cells. A western blot analysis showed that miR-483-5p increased the protein expression of PCG-1, NRF1, and TFAM and reduced the protein expression of Bax and cleaved caspase 3, inhibiting the release of cytochrome c from mitochondria and alleviating oxidative stress injury by inhibiting the production of ROS and reducing MDA activity. We confirmed that miR-483-5p targeted TNFSF8 to regulate the AMPK/JNK pathway, thereby playing a neuroprotective role after cardiopulmonary resuscitation. Hence, this study provides further insights into strategies for inhibiting neurological impairment after cardiopulmonary resuscitation and suggests a potential therapeutic target for PCABI.

2. Biomed Pharmacother. 2022 Oct 14;156:113847. doi: 10.1016/j.biopha.2022.113847. Online ahead of print.

The monoacylglycerol lipase inhibitor, JZL184, has comparable effects to therapeutic hypothermia, attenuating global cerebral injury in a rat model of cardiac arrest.

Xu J(1), Zheng G(2), Hu J(3), Ge W(3), Bradley JL(3), Ornato JP(4), Tang W(5).

ABSTRACT

Post-resuscitation cerebral ischemia-reperfusion injury (IRI) is a vital contributor to poor neurological prognosis. Exploring novel therapeutics that attenuate cerebral IRI is of great significance. Inflammation plays a role in the development of cerebral IRI after successful cardiopulmonary resuscitation (CPR). Monoacylglycerol lipase (MAGL) is an enzyme that is predominantly responsible for the metabolism of endocannabinoid 2-arachidonoylglycerol (2-AG) to arachidonic acid (AA) metabolites, which are associated with inflammation. Therefore, we investigated the efficacy of the MAGL inhibitor, JZL184, on cerebral IRI and further compared the effects to therapeutic hypothermia (TH). Thirty-six rats were randomized into three groups: 1) JZL184; 2) Control; 3) TH (N = 12 for each group). Animals underwent 6 min of ventricular fibrillation (VF) followed with 8 min of CPR. After return of spontaneous circulation (ROSC), rats received an intraperitoneal injection of JZL184 (16 mg/kg) or DMSO (20 mg/ml) or body cooling was initiated. Cerebral microcirculation, brain edema, blood brain barrier (BBB) permeability, serum neuron-specific enolase (NSE), S-100 β , interleukin-6 (IL-6) and interleukin-10 (IL-10) were quantified at 6 h post ROSC. Compared to control, treatment with JZL184 or TH was associated with significantly ameliorated cerebral microcirculation, mitigated brain edema, attenuated BBB permeability, decreased serum levels of NSE, S-100 β and IL-6, and increased serum IL-10 levels ($p < 0.05$). There was no significant difference in the above

measurements between JZL184 and TH. JZL184 has comparable neuroprotective effects to therapeutic hypothermia on global cerebral IRI in a rat model of cardiac arrest (CA).

3. Front Neurol. 2022 Sep 29;13:996112. doi: 10.3389/fneur.2022.996112. eCollection 2022.

Influence of oxygen concentration on the neuroprotective effect of hydrogen inhalation in a rat model of cardiac arrest.

Wang J(1), Shen Y(2), Li J(1), Chen B(1), Yin C(3), Li Y(1).

ABSTRACT

BACKGROUND: Post-cardiac arrest (CA) brain injury is the main cause of death in patients resuscitated from CA. Previous studies demonstrated that hydrogen inhalation mitigates post-CA brain injury. However, factors affecting the efficacy of hydrogen remain unknown. In the present study, we investigated the influence of oxygen concentration and targeted temperature on neuroprotective effect in a CA rat model of ventricular fibrillation (VF). **METHODS:** Cardiopulmonary resuscitation (CPR) was initiated after 7 min of untreated VF in adult male Sprague-Dawley rats. Immediately following successful resuscitation, animals were randomized to be ventilated with 21% oxygen and 79% nitrogen (21%O₂); 2% hydrogen, 21% oxygen, and 77% nitrogen (2%H₂ + 21%O₂); 2% hydrogen, 50% oxygen, and 48% nitrogen (2%H₂ + 50%O₂); or 2% hydrogen and 98% oxygen (2%H₂ + 98%O₂) for 3 h. For each group, the target temperature was 37.5°C for half of the animals and 35.0°C for the other half. **RESULTS:** No statistical differences in baseline measurements and CPR characteristics were observed among groups. For animals with normothermia, 2%H₂ + 50%O₂ (123 [369] vs. 500 [393], *p* = 0.041) and 2%H₂ + 98%O₂ (73 [66] vs. 500 [393], *p* = 0.002) groups had significantly lower neurological deficit scores (NDSs) at 96 h and significantly higher survival (75.0 vs. 37.5%, *p* = 0.033 and 81.3 vs. 37.5%, *p* = 0.012) than 21%O₂ group. For animals with hypothermia, no statistical difference in NDS among groups but 2%H₂ + 98%O₂ has significantly higher survival than the 21%O₂ group (93.8 vs. 56.3%, *p* = 0.014). **CONCLUSION:** In this CA rat model, inhaling 2% hydrogen combined with a high concentration of oxygen improved 96-h survival, either under normothermia or under hypothermia.

CASE REPORTS

1. Front Cardiovasc Med. 2022 Sep 29;9:1014250. doi: 10.3389/fcvm.2022.1014250. eCollection 2022.

Case report: Sudden cardiorespiratory collapse in a healthy male after coronavirus disease 2019 vaccination at a vaccination center.

Chan CC(1), Lin CP(1), Chang CJ(1), Chu PH(1).

ABSTRACT

Since 2020, new vaccines were developed to fight the coronavirus disease 2019 (COVID-19). Vaccination is important in preventing mortality and achieving herd immunity. However, due to vast vaccination, fatal adverse events could be seen. We report a case of a previously healthy, young male who had a cardiopulmonary arrest 2 min after receiving the Oxford- AstraZeneca (ChAdOx1 nCoV-19) COVID-19 vaccination. After targeted temperature management, a coronary angiogram was performed after neurological recovery and showed severe stenosis at the proximal left anterior descending artery. Stenting was done and he was discharge. No similar case of sudden cardiorespiratory collapse immediately after COVID-19 vaccination has been reported. Our patient did not have any effort-related angina or dyspnea on exertion before this event. The sudden cardiorespiratory collapse was probably related to underlying coronary artery disease, complicated with a vasovagal event. We stress the importance of coronary angiography in out of hospital cardiac arrest patients after neurological recovery. In the era of COVID-19 vaccination, even though fatal

adverse events following immunization are rare, heightened awareness of severe side effects needing medical attention is very important.

2. *J Med Case Rep.* 2022 Oct 21;16(1):391. doi: 10.1186/s13256-022-03500-w.

Neuronal desertification after a direct lightning strike: a case report.

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ABSTRACT

BACKGROUND: Lightning strike is a rare but dramatic cause of injury. Patients admitted to intensive care units (ICUs) with lightning strike frequently have a high mortality and significant long-term morbidity related to a direct brain injury or induced cardiac arrest (CA). **CASE PRESENTATION:** A 50-year-old Caucasian man was admitted to our hospital after being struck by lightning resulting in immediate CA. Spontaneous circulation was initially restored, and the man was admitted to the ICU, but ultimately died while in hospital due to neurological injury. The computer tomography scan revealed a massive loss of grey-white matter differentiation at the fronto-temporal lobes bilaterally. Somatosensory-evoked potentials demonstrated bilateral absence of the cortical somatosensory N20-potential, and the electroencephalogram recorded minimal cerebral electrical activity. The patient died on day 10 and a post-mortem study revealed a widespread loss of neurons. **CONCLUSION:** This case study illustrates severe brain injury caused by a direct lightning strike, with the patient presenting an extraordinary microscopic pattern of neuronal desertification.

3. *Ann Med Surg (Lond).* 2022 Sep 22;82:104742. doi: 10.1016/j.amsu.2022.104742. eCollection 2022 Oct.

Successful thrombolysis with low dose thrombolytic agent in a patient with acute life-threatening massive pulmonary thromboembolism: A case report.

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ABSTRACT

INTRODUCTION: and importance: Acute massive pulmonary thromboembolism is a potentially life-threatening condition requiring urgent management to decrease mortality. Although the standard dose of systemic thrombolysis with alteplase is 100 mg, half the dose of alteplase can be used to break up clots successfully, especially if bleeding is a concern. **CASE PRESENTATION:** We report a case of massive pulmonary thromboembolism presenting with cardiopulmonary arrest, successfully managed with advanced cardiac life support, anticoagulants, and low-dose thrombolytics. **CLINICAL DISCUSSION:** Management of massive pulmonary thromboembolism includes medical thrombolysis along with maintenance of hemodynamic stability. Our patient was successfully managed with low-dose thrombolytics and was continued with standard oral anticoagulants for 6 months. **CONCLUSION:** In patients of acute massive pulmonary thromboembolism, a low dose of the thrombolytic agent can achieve complete resolution of the thrombus with less bleeding risk.

4. *CJEM.* 2022 Oct 19. doi: 10.1007/s43678-022-00401-1. Online ahead of print.

Cardiac arrest caused by ruptured nonaneurysmal infectious aortitis.

Huang CH(1), Sim SS(2), Lien WC(3)(4).

NO ABSTRACT AVAILABLE

5. *Int J Mol Sci.* 2022 Oct 1;23(19):11666. doi: 10.3390/ijms231911666.

Eosinophilic Infiltration of the Sino-Atrial Node in Sudden Cardiac Death Caused by Long QT Syndrome.

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ABSTRACT

Sudden death is defined as the unexpected death of a healthy person that occurs within the first hour of the onset of symptoms or within 24 h of the victim being last seen alive. In some of these cases, rare deleterious variants of genes associated with inherited cardiac disorders can provide a highly probable explanation for the fatal event. We report the case of a 21-year-old obese woman who lost consciousness suddenly in a public place and was pronounced dead after hospital admission. Clinical autopsy showed an inconclusive gross examination, while in the histopathological analysis an eosinophilic inflammatory focus and interstitial fibrosis in the sino-atrial node were found. Molecular autopsy revealed an intronic variant in the KCNQ1 gene (c.683 + 5G > A), classified as likely pathogenic for long QT syndrome according to the guidelines provided by the American College of Medical Genetics and Genomics. Therefore, there were many anomalies that could have played a role in the causation of the sudden death, such as the extreme obesity, the cardiac anomalies and the KCNQ1 variant. This case depicts the difficult interpretation of rare cardiac structural abnormalities in subjects carrying rare variants responsible for inherited arrhythmic disorders and the challenge for the forensic pathologist to make causal inferences in the determinism of the unexpected decease.

6. Cureus. 2022 Sep 13;14(9):e29121. doi: 10.7759/cureus.29121. eCollection 2022 Sep.

Spontaneous Pulmonary Embolism Leading to Sudden Cardiac Arrest and Perimortem C-Section in a 39-Week Parturient During Induction of Labor: A Case Report.

Howard C(1), Naim O(1), Chalhoub G(1), Rodriguez E(2), Miles J(1).

ABSTRACT

We report the successful salvage of mother and baby after a perimortem cesarean delivery (PMCD) complicated by a 21-minute asystolic maternal cardiac arrest (MCA) that was precipitated by a pulmonary embolism during the early stages of induction of labor. With rapid PMCD, recovery of maternal quality of life is possible even after prolonged resuscitation.

7. Respirol Case Rep. 2022 Oct 17;10(11):e01053. doi: 10.1002/rcr2.1053. eCollection 2022 Nov.

Drowning case complicated with a cardiopulmonary arrest and severe ARDS saved with a good neurological outcome by ECMO: A case report.

Cho S(1), Furukawa T(2), Ogawa O(3).

ABSTRACT

Cardiopulmonary arrest (CPA) due to drowning has an extremely high mortality rate, and very few cases have good neurological outcomes. Severe respiratory failure can occur even after resuscitation. A 66 year old woman with a history of refractory epilepsy had a CPA due to drowning. Approximately 20 min after drowning, she was resuscitated and transported to the hospital, and extracorporeal membrane oxygenation (ECMO) was introduced on day two due to continued severe respiratory failure caused by acute respiratory distress syndrome (ARDS). After the introduction of ECMO, her respiratory status gradually improved and ECMO was discontinued on day 12. Approximately 6 months after drowning, she visited our hospital for a follow-up with a cerebral performance category of 1. Since cases of CPA due to drowning with a short drowning time or hypothermia are expected to have good neurological outcomes, the introduction of ECMO should be considered as a treatment for ARDS after resuscitation.

8. Cureus. 2022 Sep 16;14(9):e29249. doi: 10.7759/cureus.29249. eCollection 2022 Sep.

A Rare Case of Pulmonary Emboli Presenting With ST Elevation on ECG.

Gheith Z(1), Alqam B(2), Jagana R(3).

ABSTRACT

Pulmonary embolism is a common medical emergency and often life threatening but can be misdiagnosed frequently leading to fatal outcomes. Changes in electrocardiogram (ECG) are common in pulmonary embolism and rarely they can present with ST elevation. We here describe a 79-year-old woman who presented after a cardiac arrest and was found have ST-segment elevation on ECG with normal coronary angiogram while CT scan revealing pulmonary embolism.