

This week's PubMed 21st – 27th August 2022: articles of interest n = 38

CPR AND COVID-19

1. J Microbiol Immunol Infect. 2022 Aug 11:S1684-1182(22)00108-6. doi: 10.1016/j.jmii.2022.07.009. Online ahead of print.

Out-of-hospital cardiac arrest and in-hospital mortality among COVID-19 patients: A population-based retrospective cohort study.

Chan SY(1), Tsai YF(2), Yen MY(3), Yu WR(4), Hung CC(5), Kuo TL(5), Chen CC(6), Yen YF(7), Huang SH(8), Huang TC(9), Huang SJ(10).

ABSTRACT

BACKGROUND/PURPOSE: Predictors for out-of-hospital cardiac arrest (OHCA) in COVID-19 patients remain unclear. We identified the predictors for OHCA and in-hospital mortality among such patients in community isolation centers. METHODS: From May 15 to June 20, 2021, this cohort study recruited 2555 laboratory-confirmed COVID-19 patients admitted to isolation centers in Taiwan. All patients were followed up until death, discharge from the isolation center or hospital, or July 16, 2021. OHCA was defined as cardiac arrest confirmed by the absence of circulation signs and occurring outside the hospital. Multinomial logistic regressions were used to determine factors associated with OHCA and in-hospital mortality. RESULTS: Of the 37 deceased patients, 7 (18.9%) had OHCA and 30 (81.1%) showed in-hospital mortality. The mean (SD) time to OHCA was 6.6 (3.3) days from the symptom onset. After adjusting for demographics and comorbidities, independent predictors for OHCA included age ≥ 65 years (adjusted odds ratio [AOR]: 13.24, 95% confidence interval [CI]: 1.85-94.82), fever on admission to the isolation center (AOR: 12.53, 95% CI: 1.68-93.34), and hypoxemia (an oxygen saturation level below 95% on room air) (AOR: 26.54, 95% CI: 3.18-221.73). Predictors for in-hospital mortality included age ≥ 65 years (AOR: 10.28, 95% CI: 2.95-35.90), fever on admission to the isolation centers (AOR: 7.27, 95% CI: 1.90-27.83), and hypoxemia (AOR: 29.87, 95% CI: 10.17-87.76). CONCLUSIONS: Time to OHCA occurrence is rapid in COVID-19 patients. Close monitoring of patients' vital signs and disease severity during isolation is important, particularly for those with older age, fever, and hypoxemia.

2. BMC Nurs. 2022 Aug 25;21(1):238. doi: 10.1186/s12912-022-01020-y.

Healthcare providers' experiences in hospital resuscitation of patients with COVID-19: a qualitative study.

Goodarzi A(1), Khodaveisi M(2), Abdi A(3), Salimi R(4), Oshvandi K(5).

ABSTRACT

BACKGROUND: The COVID-19 epidemic has globally challenged medical practices, including cardiopulmonary resuscitation (CPR). Numerous challenges affect healthcare providers (HCPs) who are members of the resuscitation team and the resuscitation process in COVID-19 patients. As a result, HCPs may experience different dilemmas about CPR. Failure to recognize these experiences can harm both HCPs and patients. This study aimed to explore the HCP's experiences of CPR in patients with COVID-19. METHODS: A qualitative study was conducted using semi-structured interviews with 26 participants in the emergency departments of Besat, Golestan, and Imam Reza hospitals (in the west of Iran) using the hermeneutic phenomenology approach. The data were analyzed using the 6-step Smith interpretative phenomenological analysis (IPA) method. RESULTS: The mean age of the participants was 38 years. Most of them (61.5%) were male and had a Bachelor's degree in nursing (46.1%). The data analysis resulted in extracting four super-ordinate and nine sub-ordinate themes. "Human aspects of Care", "Perceived Psychological Effects of Resuscitation in COVID-19", "HCP's perceptions of factors affecting the resuscitation process in

COVID-19", and "Perceived differences in COVID-19 resuscitation compared to non-COVID patients" were super-ordinate themes. CONCLUSIONS: The participants experienced a wide range of difficult feelings and emotions while resuscitating the patients with COVID-19, suggesting the effect of the COVID-19 epidemic on HCPs and the resuscitation process. They experienced stress and fear, and the resuscitation process was influenced by their compassion, underlying patient conditions, resuscitation futility, and participants' fatigue or lack of oxygen due to the use of personal protective equipment (PPE).

CPR/MECHANICAL CHEST COMPRESSION

1. Resusc Plus. 2022 Aug 10;11:100286. doi: 10.1016/j.resplu.2022.100286. eCollection 2022 Sep. **Comparison of different methods of more effective chest compressions during cardiopulmonary resuscitation (CPR) in the dental chair.**

Hitosugi T(1), Awata N(2), Miki Y(3), Tsukamoto M(4), Yokoyama T(1).

ABSTRACT

INTRODUCTION: When performing cardiopulmonary resuscitation (CPR) on a patient who has suffered a cardiopulmonary arrest during dental treatment, few dental chairs have sufficient stability to perform effective chest compressions. We previously proposed a method of stabilizing the backrest of a dental chair using a support stool. As a result, we confirmed that the vertical displacement of the backrest could be significantly reduced. In the present study, we verified the effectiveness of the stool stabilization method using several dental chairs (flat and curved) with significantly different backrest shapes. METHODS: Vertical displacement of the backrests of dental chairs was recorded. Data were obtained at three different stool positions (without a stool, under the chest at the level that participants were performing manual chest compressions, and under the shoulders). Reduction displacement ratios were calculated to evaluate the effectiveness of the stool positions. RESULTS: The method significantly reduced the vertical displacement of the backrest for all types. When the curvature of the backrest was large, the reduction in vertical displacement was 40% when the stool was placed under the chest at the level of manual chest compressions and 65% when placed underneath the shoulder. In the case of a flat dental chair, this reduction was 90% when using a stool in either position, compared to no stool. CONCLUSION: When we need to perform CPR on a patient in the dental chair, placing a stool under the shoulders allows effective manual chest compression by firmly supporting the backrest of a dental chair of any shape.

REGISTRIES, REVIEWS AND EDITORIALS

1. Resusc Plus. 2022 Aug 12;11:100289. doi: 10.1016/j.resplu.2022.100289. eCollection 2022 Sep. **The association between signs of medical distress preceding in-hospital cardiac arrest and 30-day survival - A register-based cohort study.**

Thuccani M(1)(2), Rawshani A(1)(2), Skoglund K(1)(2), Bergh N(1)(2), Nordberg P(3), Albert M(3), Rosengren A(1), Herlitz J(4)(1), Rylander C(5), Lundgren P(1)(4)(2).

ABSTRACT

BACKGROUND: Identifying signs of medical distress prior to in-hospital cardiac arrest (IHCA) is important to prevent IHCA and improve survival. The primary objective of this study was to investigate the association between signs of medical distress present within 60 minutes prior to cardiac arrest and survival after cardiac arrest. METHODS: The register-based cohort study included adult patients (≥ 18 years) with IHCA in the Swedish Registry of Cardiopulmonary Resuscitation (SRCR) from 2017-01-01 to 2020-07-15. Signs of distress prior to IHCA were defined as the medical

signs arrhythmia, pulmonary oedema, hypotension, hypoxia or seizures present within 60 minutes prior to cardiac arrest (pre-arrest signs). Using multivariable logistic regression, the association between these pre-arrest signs and 30-day survival was analysed in both unadjusted and adjusted models. The covariates used were demographics, comorbidities, characteristics and treatment of cardiac arrest. RESULTS: In total, 8525 patients were included. After adjusting for covariates, patients with arrhythmia had a 58% higher probability of 30-day survival. The adjusted probability of 30-day survival was 41% and 52% lower for patients with hypotension and hypoxia prior to IHCA, respectively. Pulmonary oedema and seizures were not associated with any change in 30-day survival. CONCLUSIONS: Among signs of medical distress prior to in-hospital cardiac arrest, arrhythmia was associated with a higher 30-day survival. Hypotension and hypoxia were associated with lower survival after IHCA. These findings indicate that future research on survival after cardiac arrest should take pre-arrest signs into account as it impacts the prerequisites for survival.

2. Resuscitation. 2022 Aug 22:S0300-9572(22)00644-X. doi: 10.1016/j.resuscitation.2022.08.009. Online ahead of print.

External validation of the simple NULL-PLEASE clinical score in predicting outcomes of out-of-hospital cardiac arrest in the Danish population - a nationwide registry-based study.

Byrne C(1), Barcella CA(2), Lukacs Krogager M(3), Pareek M(4), Bundgaard Ringgren K(3), Porsborg Andersen M(5), Helen Anna Mills E(3), Wissenberg M(4), Folke F(6), Gislason G(4), Køber L(7), Lippert F(8), Kjærgaard J(7), Hassager C(7), Torp-Pedersen C(5), Kragholm K(3), Lip GYH(9).

ABSTRACT

AIM: The NULL-PLEASE score (Nonshockable rhythm, Unwitnessed arrest, Long no-flow or Long low-flow period, blood pH <7.2, Lactate >7.0 mmol/L, End-stage renal disease on dialysis, Age ≥85 years, Still resuscitation, and Extracardiac cause) may identify patients with out-of-hospital cardiac arrest (OHCA) unlikely to survive. We aimed to validate the NULL-PLEASE score in a nationwide setting. METHODS: We used Danish nationwide registry data from 2001-2019 and identified OHCA survivors with return of spontaneous circulation (ROSC) or ongoing cardiopulmonary resuscitation at hospital arrival. The primary outcome was 1-day mortality. Secondary outcomes were 30-day mortality and the combined outcome of 1-year mortality or anoxic brain damage. The risks of outcomes were estimated using logistic regression with a NULL-PLEASE score of 0 as reference (range 0-14). The predictive ability of the score was examined using the area under the receiver operating characteristics (AUCROC) curve. RESULTS: A total of 3,881 patients were included in the analyses. One-day mortality was 35%, 30-day mortality was 61%, and 68% experienced the combined outcome. For a NULL-PLEASE score ≥9 (n=244) the absolute risks were: 1-day mortality: 80.7% (95% confidence interval [CI]: 75.8-85.7%); 30-day mortality: 98.0% (95% CI: 96.2-99.7%); and the combined outcome: 98.4% (95% CI: 96.8-100.0%). Corresponding AUCROC values were 0.800 (95% CI: 0.786-0.814) for 1-day mortality, 0.827 (95% CI: 0.814-0.840) for 30-day mortality, and 0.828 (95% CI: 0.815-0.841) for the combined outcome. CONCLUSIONS: In a nationwide OHCA-cohort, AUCROC values for the predictive ability of NULL-PLEASE were high for all outcomes. However, some survived even with high NULL-PLEASE scores.

3. Resuscitation. 2022 Aug 23:S0300-9572(22)00648-7. doi: 10.1016/j.resuscitation.2022.08.013. Online ahead of print.

The immunology of the post-cardiac arrest syndrome.

Cunningham CA(1), Coppler PJ(2), Skolnik AB(3).

ABSTRACT

Patients successfully resuscitated from cardiac arrest often have brain injury, myocardial dysfunction, and systemic ischemia-reperfusion injury, collectively termed the post-cardiac arrest

syndrome (PCAS). To improve outcomes, potential therapies must be able to be administered early in the post-arrest course and provide broad cytoprotection, as ischemia-reperfusion injury affects all organ systems. Our understanding of the immune system contributions to the PCAS has expanded, with animal models detailing biologically plausible mechanisms of secondary injury, the protective effects of available immunomodulatory drugs, and how immune dysregulation underlies infection susceptibility after arrest. In this narrative review, we discuss the dysregulated immune response in PCAS, human trials of targeted immunomodulation therapies, and future directions for immunomodulation following cardiac arrest.

4. Intern Med J. 2022 Aug 24. doi: 10.1111/imj.15918. Online ahead of print.

Inconsistent discharge diagnoses for young cardiac arrest episodes: insights from a state-wide registry.

Paratz ED(1)(2)(3), van Heusden A(1), Ball J(1)(4)(5), Smith K(4)(5)(6), Zentner D(7)(8), Morgan N(9), Parsons S(5)(8), Thompson T(7), James P(7), Connell V(10), Pflaumer A(10)(11)(12), Semsarian C(13), Ingles J(14), Stub D(1)(2)(4)(5), La Gerche A(1)(2)(3).

ABSTRACT

BACKGROUND: Administrative coding of out-of-hospital cardiac arrest (OHCA) is heterogeneous, with the prevalence of non-informative diagnoses uncertain. **METHODS:** Hospital discharge diagnoses provided to a state-wide OHCA registry were characterized as either 'informative' or 'non-informative'. 'Informative' diagnoses stated an OHCA had occurred or defined OHCA as occurring due to coronary artery disease, cardiomyopathy, channelopathy, definite non-cardiac cause, or no known cause. Non-informative diagnoses were blank, stated presenting cardiac rhythm only, provided irrelevant information or presented a complication of the OHCA as the main diagnosis. Characteristics of patients receiving informative versus non-informative diagnoses were compared. **RESULTS:** Of 1,479 OHCA patients aged 1-50 years, 290 patients were admitted to 15 hospitals. 90 diagnoses (31.0%) were non-informative (arrest rhythm = 50, blank = 21, complication = 10, irrelevant = 9). 200 diagnoses (69.0%) were informative (cardiac arrest = 84, coronary artery disease = 54, non-cardiac diagnosis = 48, cardiomyopathy = 8, arrhythmia disorder = 4, unascertained = 2). Only ten diagnoses (3.5%) included both the fact of OHCA and an underlying cause. Patients receiving a non-informative diagnosis were more likely to have survived OHCA or been referred for forensic assessment ($p=0.011$) and had longer median length of stay (9 vs 5 days, $p=0.0019$). **CONCLUSION:** Almost one-third of diagnoses for young patients discharged after an OHCA included neither the fact of OHCA nor any underlying cause. Under-estimating the burden of OHCA impacts ongoing patient and at-risk family care, data sampling strategies, international statistics and research funding.

5. Emerg Med Pract. 2022 Sep 1;24(9):1-24. Epub 2022 Sep 2.

Advances in cardiac resuscitation in the emergency department.

Medlej K(1), Nikolic I(2).

ABSTRACT

Cardiogenic shock, cardiac arrest, and circulatory failure are life-threatening, and recognizing the underlying etiology and initiating treatment to promote perfusion are key to managing these patients and improving outcomes. This issue reviews the current evidence on diagnosis and management of cardiogenic shock, including oxygen supplementation, red blood cell transfusion, vasopressors, and inotropes. A summary of the various mechanical circulatory support options, including inclusion/exclusion criteria and admission and inter-facility transfer guidance, is included. Special considerations regarding the resuscitation and management of patients with intracorporeal

left ventricular assist devices who are experiencing circulatory failure are outlined, including testing, imaging, and treatment.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2022 Aug 22:S0300-9572(22)00646-3. doi: 10.1016/j.resuscitation.2022.08.011. Online ahead of print.

Duration of Resuscitation and Long-Term Outcome After In-Hospital Cardiac Arrest: A Nationwide Observational Study.

Yonis H(1), Porsborg Andersen M(2), Helen Anna Mills E(3), Gregers Winkel B(4), Wissenberg M(5), Køber L(4), Gislason G(6), Folke F(7), Moesgaard Larsen J(3), Sjøgaard P(3), Torp-Pedersen C(8), Hay Kragholm K(9).

ABSTRACT

BACKGROUND: Prior studies have investigated the association between duration of resuscitation and short-term outcomes following in-hospital cardiac arrest (IHCA). However, it remains unknown whether there is an association between duration of resuscitation and long-term survival and functional outcomes. **METHOD:** We linked data from the Danish in-hospital cardiac arrest registry with nationwide registries and identified 8,727 patients between 2013 and 2019. Patients were stratified into four groups (A-D) according to quartiles of duration of resuscitation. Standardized average probability of outcomes was estimated using logistic regression. **RESULTS:** Of 8,727 patients, 53.1% (n=4,604) achieved return of spontaneous circulation. Median age was 74 (1st-3rd quartile [Q1-Q3] 65-81 years) and 63.1% were men. Among all IHCA patients the standardized 30-day survival was 62.0% (95% CI 59.8%-64.2%) for group A (< 5 minutes), 32.7% (30.8%-34.6%) for group B (5-11 minutes), 14.4% (12.9%-15.9%) for group C (12-20 minutes) and 8.1% (7.0%-9.1%) for group D (21 minutes or more). Similarly, 1-year survival was also highest for group A (50.4%; 48.2%-52.6%) gradually decreasing to 6.6% (5.6%-7.6%) in group D. Among 30-day survivors, survival without anoxic brain damage or nursing home admission within one-year post-arrest was highest for group A (80.4%; 78.2%-82.6%), decreasing to 73.3% (70.0%-76.6%) in group B, 67.2% (61.7%-72.6%) in group C and 73.3% (66.9%-79.7%) in group D. **CONCLUSION:** Shorter duration of resuscitation attempt during an IHCA is associated with higher 30-day and 1-year survival. Furthermore, we found that the majority of 30-day survivors were still alive 1-year post-arrest without anoxic brain damage or nursing home admission despite prolonged resuscitation.

2. Resuscitation. 2022 Aug 24:S0300-9572(22)00649-9. doi: 10.1016/j.resuscitation.2022.08.014. Online ahead of print.

Socioeconomic status and outcomes after in-hospital cardiac arrest.

Stankovic N(1), Holmberg MJ(2), Granfeldt A(3), Andersen LW(4).

ABSTRACT

AIM: To investigate the association between socioeconomic status and outcomes after in-hospital cardiac arrest in Denmark. **METHODS:** We conducted an observational cohort study based on nationwide registries and prospectively collected data on in-hospital cardiac arrest from 2017 and 2018 in Denmark. Unadjusted and adjusted analyses using regression models were performed to assess the association between socioeconomic status and outcomes after in-hospital cardiac arrest. Outcomes included return of spontaneous circulation (ROSC), survival to 30 days, survival to one year, and the duration of resuscitation among patients without ROSC. **RESULTS:** A total of 3,223 patients with in-hospital cardiac arrest were included in the study. In the adjusted analyses, high household assets were associated with 1.20 (95%CI: 0.96, 1.51) times the odds of ROSC, 1.49 (95%CI: 1.14, 1.96) times the odds of survival to 30 days, 1.40 (95%CI: 1.04, 1.90) times the odds of survival to one year, and 2.8 (95%CI: 0.9, 4.7) minutes longer duration of resuscitation among patients without ROSC compared to low household assets. Similar albeit attenuated associations were observed for education. While high household income was associated with better outcomes in the

unadjusted analyses, these associations largely disappeared in the adjusted analyses. **CONCLUSIONS:** In this study of patients with in-hospital cardiac arrest, we found that high household assets were associated with a higher odds of survival and a longer duration of resuscitation among patients without ROSC compared to low household assets. However, the effect size may potentially be small. The results varied based on socioeconomic status measure, outcome of interest, and across adjusted analyses.

INJURIES AND CPR

1. J Trauma Acute Care Surg. 2022 Aug 24. doi: 10.1097/TA.0000000000003769. Online ahead of print.

Surgical stabilization of rib fractures versus nonoperative treatment in patients with multiple rib fractures following cardiopulmonary resuscitation: an international, retrospective matched case-control study (CWIS-CPR).

Prins JTH(1), Van Lieshout EMM(1), Eriksson EA(2), Barnes M(3), Blokhuis TJ(4), Caragounis EC(5), Benjamin Christie D 3rd(3), De Loos ER(6), DeVoe WB(7), Formijne Jonkers HA(8), Kiel B(7), Ko HJ(9), Marasco SF(10), Spanjersberg WR(11), Su YH(9), Summerhayes RG(10), Van Huijstee PJ(12), Vermeulen J(13), Vos DI(14), Verhofstad MHJ(1), Wijffels MME(1).

ABSTRACT

BACKGROUND: The presence of six or more rib fractures or a displaced rib fracture due to cardiopulmonary resuscitation (CPR) has been associated with longer hospital and intensive care unit (ICU) length of stay. Evidence on the effect of surgical stabilization of rib fractures (SSRF) following CPR is limited. This study aimed to evaluate outcomes after SSRF versus nonoperative management in patients with multiple rib fractures after CPR. **METHODS:** An international, retrospective study was performed in patients who underwent SSRF or nonoperative management for multiple rib fractures following CPR between January 1, 2012 and July 31, 2020. Patients who underwent SSRF were matched to nonoperative controls by cardiac arrest location and cause, rib fracture pattern, and age. The primary outcome was ICU length of stay (LOS). **RESULTS:** Thirty-nine operatively treated patient were matched to 66 nonoperatively managed controls with comparable CPR-related characteristics. Patients who underwent SSRF more often had displaced rib fractures (n = 28, 72% vs. n = 31, 47%; p = 0.015) and a higher median number of displaced ribs (2, P25-P75 0-3 vs. 0, P25-P75 0-3; p = 0.014). SSRF was performed at a median of 5 days (P25-P75 3-8) after CPR. In the nonoperative group, a rib fixation specialist was consulted in 14 patients (21%). The ICU LOS was longer in the SSRF group (13 days, P25-P75 9-23 vs. 9 days, P25-P75 5-15; p = 0.004). Mechanical ventilator-free days, hospital LOS, thoracic complications, and mortality were similar. **CONCLUSION:** Despite matching, those who underwent SSRF over nonoperative management for multiple rib fractures following CPR had more severe consequential chest wall injury and a longer ICU LOS. A benefit of SSRF on in-hospital outcomes could not be demonstrated. A low consultation rate for rib fixation in the nonoperative group indicates that the consideration to perform SSRF in this population might be associated with other non-radiographic or injury-related variables.

CAUSE OF THE ARREST

1. BMJ Open. 2022 Aug 23;12(8):e062877. doi: 10.1136/bmjopen-2022-062877.

Epidemiology of out-of-hospital cardiac arrests caused by anaphylaxis and factors associated with outcomes: an observational study.

Murasaka K(1), Yamashita A(2), Wato Y(3), Inaba H(3)(4)(5).

ABSTRACT

OBJECTIVES: Describe the epidemiologic features of out-of-hospital cardiac arrest (OHCA) caused by anaphylaxis and identify outcome-associated factors. **DESIGN:** Observational study. **SETTING:** Data from the Japanese Fire and Disaster Management Agency database. **PARTICIPANTS:** A total of 292 patients from 879 057 OHCA events between 2013 and 2019 with OHCA caused by anaphylaxis and for whom prehospital resuscitation was attempted were included in the analysis. **OUTCOME MEASURES:** The incidence of anaphylaxis-induced OHCA, neurologically favourable 1-month survival, defined as cerebral performance category 1 or 2, and 1-month survival. **RESULTS:** The proportion of OHCA caused by anaphylaxis was high in non-elderly and male patients from July to September and during business hours. Bystander-witnessed (adjusted OR=4.43; 95% CI 1.84 to 10.7) and emergency medical service-witnessed events (adjusted OR=3.28; 95% CI 1.21 to 8.87) were associated with higher rates of neurologically favourable 1-month survival as well as better 1-month survival. Shockable initial ECG rhythms were recorded in only 19 patients (6.5%), and prehospital defibrillation was attempted in 16 such patients (84.2%). Neither shockable initial rhythms nor prehospital defibrillation was associated with better outcomes. Patients requiring advanced airway management had poor neurological outcomes (adjusted OR=0.17; 95% CI 0.07 to 0.42) and worse 1-month survival (adjusted OR=0.28; 95% CI 0.14 to 0.58). **CONCLUSIONS:** Few cases of OHCA were attributable to anaphylaxis. Witnessed OHCA, particularly those witnessed by bystanders, were associated with better neurological outcomes. Airway complications requiring advanced airway management were likely associated with poor outcomes.

2. *Epilepsy Behav.* 2022 Aug 23;135:108881. doi: 10.1016/j.yebeh.2022.108881. Online ahead of print.

Epileptic seizures and Epilepsy Monitoring Unit admission disclose latent cardiac electrical instability.

Pang TD(1), Nearing BD(2), Schachter SC(3), Verrier RL(2).

ABSTRACT

BACKGROUND: Sudden cardiac arrest results from cardiac electrical instability and is 3-fold more frequent in patients with chronic epilepsy than in the general population. We hypothesized that focal to bilateral tonic-clonic seizures (FTBTCS) would acutely impact T-wave alternans (TWA), a marker of cardiac electrical instability linked to an elevated risk for sudden cardiac death, more than focal seizures (FS) [focal aware seizures (FAS) and focal with impaired awareness seizures (FIAS)], due to their greater sympathetic stimulation of the heart. Since stress has been shown to cause significant TWA elevations in patients with heart disease, we also hypothesized that the early days of an inpatient admission to an epilepsy monitoring unit (EMU) would be associated with higher TWA levels compared to later hospital days in patients with chronic epilepsy, presumably due to stress. **DESIGN/METHODS:** We analyzed the acute effects of seizures [FAS, FIAS, FTBTCS, and nonepileptic seizures (NES)] and day of hospital stay on TWA in 18 patients admitted to the EMU using high-resolution wireless electrocardiographic (ECG) patch monitors. **RESULTS:** A total of 5 patients had FTBTCS, 7 patients had FS (2 FAS, 5 FIAS), and 3 patients had NES only during the index hospital stay. Four patients did not have any electroclinical seizures or NES. FTBTCS resulted in marked acute increases in ictal TWA from baseline ($2 \pm 0.3 \mu\text{V}$) to ictal maximum ($70 \pm 6.1 \mu\text{V}$, $p < 0.0001$), the latter exceeding the $60 \mu\text{V}$ cut point defined as severely abnormal. By comparison, while FAS and FIAS also provoked significant increases in TWA (from $2 \pm 0.5 \mu\text{V}$ to $30 \pm 3.3 \mu\text{V}$, $p < 0.0001$), maximum ictal TWA levels did not reach the $47 \mu\text{V}$ cut point defined as abnormal. Heart rate increases during FTBTCS from baseline (62 ± 5.8 beats/min) to ictal maximum (134 ± 8.6 beats/min, an increase of 72 ± 7.2 beats/min, $p < 0.02$) were also greater ($p = 0.014$) than heart rate increases during FS (from 70 ± 5.2 beats/min to 118 ± 6.2 beats/min, an increase of 48 ± 2.6 beats/min, $p < 0.03$). In 3 patients with NES, TWA rose mildly during the patients' typical episodes (from

$2 \pm 0.6 \mu\text{V}$ to $14 \pm 2.6 \mu\text{V}$, $p < 0.0004$), well below the cut point of abnormality, while heart rate increases were observed (from 75 ± 1.3 to 112 ± 8.7 beats/min, an increase of 37 ± 8.9 beats/min, $p = 0.03$). Patients with EEG-confirmed electroclinical seizures recorded while in the EMU exhibited significantly elevated interictal TWA maxima ($61 \pm 3.4 \mu\text{V}$) on EMU admission day which were similar in magnitude to ictal maxima seen during FTBTCS ($70 \pm 6.1 \mu\text{V}$, $p = 0.21$). During subsequent days of hospitalization, daily interictal TWA maxima showed gradual habituation in patients with both FS and FTBTCS but not in patients with NES only. CONCLUSIONS: This is the first study to our knowledge demonstrating that FTBTCS acutely provoke highly significant increases in TWA to levels that have been associated with heightened risk for sudden cardiac death in other patient populations. We speculate that mortality temporally associated with FTBTCS may, in some cases, be due to sudden cardiac death rather than respiratory failure. In patients with EEG-confirmed epilepsy, hospital admission is associated with interictal TWA maxima that approach those seen during FTBTCS, presumably related to stress during the early phase of hospitalization compared to later in the hospitalization, indicating cardiac electrical instability and potential vulnerability to sudden cardiac death related to stress independent of temporal relationships to seizures. The elevated heart rates observed acutely with seizures and on hospital Day 1 are consistent with a hyperadrenergic state and the effect of elevated sympathetic output on a vulnerable cardiac substrate, a phenomenon termed "the Epileptic Heart."

3. Acad Emerg Med. 2022 Aug 24. doi: 10.1111/acem.14584. Online ahead of print.

Cocaethylene Cardiotoxicity in Emergency Department Patients with Acute Drug Overdose.

Shastry S(1), Manoochehri O(2), Richardson LD(1)(3), Manini AF(1)(4).

ABSTRACT

OBJECTIVES: Cocaine use results in over 500,000 emergency department (ED) visits annually across the U.S. and ethanol co-ingestion is reported in 34% of these. Commingling cocaine with ethanol results in the metabolite cocaethylene (CE), which is metabolically active for longer than cocaine alone. Current literature on the cardiotoxicity of CE compared to cocaine alone is limited and lacks consensus. The present study aims to fill this gap in the literature and examine cardiovascular events in cocaine use as confirmed by urine toxicology versus CE exposure. **METHODS:** This was a secondary data analysis of a prospective cohort study of adult patients with acute drug overdose at two urban tertiary care hospital Emergency Departments (EDs) over four years. Patients with positive urinary cocaine metabolites were analyzed and outcomes were compared between patients with overdose and confirmed presence of cocaine on urine toxicology (cocaine group) and patients with cocaine and ethanol use (CE group). The primary outcome was cardiac arrest. Secondary outcomes included myocardial injury and hyperlactatemia. Data was analyzed using multivariable regression models. **RESULTS:** We enrolled a total of 199 patients (150 cocaine, 49 CE). Rates of cardiac arrest were significantly higher in the CE group compared to cocaine (6.1% vs. 0.67%, $p = 0.048$). Cocaine was significantly associated with myocardial injury compared to CE exposure (mean initial troponin 0.01 vs. 0.16 ng/mL, $p = 0.021$), while hyperlactatemia was associated with CE exposure (mean initial lactate 4.1 vs. 2.9 mmol/L, $p = 0.038$). **CONCLUSIONS:** When compared to cocaine exposure alone, CE exposure in ED patients with acute drug overdose was significantly associated with higher occurrence of cardiac arrest, higher mean lactate concentrations, and lower occurrence of myocardial injury.

END-TIDAL CO₂

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

No articles identified.

TRAUMA

1. Prehosp Emerg Care. 2022 Aug 22:1-15. doi: 10.1080/10903127.2022.2113941. Online ahead of print.

Characteristics and outcomes of traumatic cardiac arrests in the Pan-Asian Resuscitation

Outcomes Study.

Lee MHM(1), Chia MYC(1), Fook-Chong S(2), Shahidah N(3), Tagami T(4), Ryu HH(5), Lin CH(6), Karim SA(7), Jirapong S(8), Rajanarsing Rao HV(9), Cai W(10), Velasco BP(11), Khan NU(12), Son DN(13), Naroo GY(14), El Sayed M(15), Ong MEH(3)(16).

ABSTRACT

Objective: Little is known about survival outcomes after traumatic cardiac arrest in Asia, or the association of Utstein factors with survival after traumatic cardiac arrests. This study aimed to describe the epidemiology and outcomes of traumatic cardiac arrests in Asia, and analyze Utstein factors associated with survival. Methods: Traumatic cardiac arrest patients from 13 countries in the Pan-Asian Resuscitation Outcomes Study registry from 2009 to 2018 were analyzed. Multilevel logistic regression was performed to identify factors associated with the primary outcomes of survival to hospital discharge and favorable neurological outcome (Cerebral Performance Category (CPC) 1-2), and the secondary outcome of return of spontaneous circulation (ROSC). Results: There were 207455 out-of-hospital cardiac arrest cases, of which 13631 (6.6%) were trauma patients aged 18 years and above with resuscitation attempted and who had survival outcomes reported. The median age was 57 years (interquartile range 39-73), 23.0% received bystander cardiopulmonary resuscitation (CPR), 1750 (12.8%) had ROSC, 461 (3.4%) survived to discharge, and 131 (1.0%) had CPC 1-2. Factors associated with higher rates of survival to discharge and favorable neurological outcome were arrests witnessed by emergency medical services or private ambulances (survival to discharge adjusted odds ratio (aOR) = 2.95, 95% confidence interval (CI) = 1.99-4.38; CPC 1-2 aOR = 2.57, 95% CI = 1.25-5.27), bystander CPR (survival to discharge aOR = 2.16; 95% CI 1.71-2.72; CPC 1-2 aOR = 4.98, 95% CI = 3.27-7.57), and initial shockable rhythm (survival to discharge aOR = 12.00; 95% CI = 6.80-21.17; CPC 1-2 aOR = 33.28, 95% CI = 11.39-97.23) or initial pulseless electrical activity (survival to discharge aOR = 3.98; 95% CI = 2.99-5.30; CPC 1-2 aOR = 5.67, 95% CI = 3.05-10.53) relative to asystole. Conclusions: In traumatic cardiac arrest, early aggressive resuscitation may not be futile and bystander CPR may improve outcomes.

VENTILATION

1. Pediatrics. 2022 Aug 24:e2021053030. doi: 10.1542/peds.2021-053030. Online ahead of print.

Improving Ventilation Rates During Pediatric Cardiopulmonary Resuscitation.

Chapman JD(1), Geneslaw AS(1), Babineau J(1), Sen AI(1).

ABSTRACT

BACKGROUND: Excessive ventilation at rates of 30 breaths per minute (bpm) or more during cardiopulmonary resuscitation (CPR) decreases venous return and coronary perfusion pressure, leading to lower survival rates in animal models. A review of our institution's pediatric CPR data revealed that patients frequently received excessive ventilation. **METHODS:** We designed a multifaceted quality improvement program to decrease the incidence of clinically significant hyperventilation (≥ 30 bpm) during pediatric CPR. The program consisted of provider education, CPR ventilation tools (ventilation reminder cards, ventilation metronome), and individual CPR team member feedback. CPR events were reviewed pre- and postintervention. The first 10 minutes of each CPR event were divided into 20 second epochs, and the ventilation rate in each epoch was measured via end-tidal carbon dioxide waveform. Individual epochs were classified as within the target ventilation range (< 30 bpm) or clinically significant hyperventilation (≥ 30 bpm). The proportion of epochs with clinically significant hyperventilation, as well as median ventilation rates, were analyzed in the pre- and postintervention periods. **RESULTS:** In the preintervention period (37 events, 699 epochs), 51% of CPR epochs had ventilation rates ≥ 30 bpm. In the postintervention period (24 events, 426 epochs), the proportion of CPR epochs with clinically significant hyperventilation decreased to 29% ($P < .001$). Median respiratory rates decreased from 30 bpm (interquartile range 21-36) preintervention to 21 bpm (interquartile range 12-30) postintervention ($P < .001$). **CONCLUSIONS:** A quality improvement initiative grounded in improved provider education, CPR team member feedback, and tools focused on CPR ventilation rates was effective at reducing rates of clinically significant hyperventilation during pediatric CPR.

CEREBRAL MONITORING

No articles identified.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. Resuscitation. 2022 Aug 23:S0300-9572(22)00647-5. doi: 10.1016/j.resuscitation.2022.08.012.

Online ahead of print.

Firefighters as first-responders in out-of-hospital cardiac arrest- a retrospective study of a time-gain selective dispatch system in the Skåne Region, Sweden.

Andréll C(1), Dankiewicz J(2), Todorova L(3), Olanders K(4), Ullén S(5), Friberg H(6).

ABSTRACT

AIM: To analyze the impact of a time-gain selective, first-responder dispatch system on the presence of a shockable initial rhythm (SIR), return of spontaneous circulation (ROSC) and 30-day survival after out-of-hospital cardiac arrest (OHCA). **METHOD:** A retrospective observational study comprising OHCA registry data and dispatch data in the Skåne Region, Sweden (2010-2018). Data were categorized according to dispatch procedures, two ambulances (AMB-only) versus two ambulances and firefighter first-responders (DUAL-dispatch), based on the dispatcher's estimation of a time-gain. Dual dispatch was sub-categorized by arrival of first vehicle (first-responder or ambulance). Logistic

regressions were used, additionally with groups matched (1:1) for age, witnessed event, bystander cardiopulmonary resuscitation and ambulance response time. Adjusted and conditional odds-ratios (aOR, cOR) with 95% confidence intervals (CI) are presented. RESULTS: Of 3,245 eligible cases, 43% were DUAL-dispatches with first-responders first on scene (FR-first) in 72%. Despite a five-minute median reduction in response time in the FR-first group, no association with SIR was found (aOR 0.83, 95%CI 0.64-1.07) nor improved 30-day survival (aOR 1.03, 95%CI 0.72-1.47). A positive association between ROSC and the FR-first group (aOR 1.25, 95%CI 1.02-1.54) disappeared in the matched analysis (cOR 1.12, 95%CI 0.87-1.43). Time to first monitored rhythm was 7:06 minutes in the FR-first group versus 3:01 in the combined AMB-only/AMB-first groups. CONCLUSION: In this time-gain selective first-responder dispatch system, a shorter response time was not associated with increased SIR, improved ROSC rate or survival. Process measures differed between the study groups which could account for the observed findings and requires further investigation.

2. PLoS One. 2022 Aug 24;17(8):e0273028. doi: 10.1371/journal.pone.0273028. eCollection 2022.

Development of an intervention to facilitate dissemination of community-based training to respond to out-of-hospital cardiac arrest: FirstCPR.

Munot S(1), Bray J(2), Bauman A(3), Rugel EJ(1), Bezerra Giordan L(1), Marschner S(1), Chow CK(1)(4), Redfern J(4)(5).

ABSTRACT

BACKGROUND AND AIM: Out-of-hospital cardiac arrest (OHCA) is a significant public health issue with low survival rates. Prompt bystander action can more than double survival odds. OHCA response training is primarily pursued due to work-related mandates, with few programs targeting communities with lower training levels. The aim of this research was to describe the development process of a targeted multicomponent intervention package designed to enhance confidence and training among laypeople in responding to an OHCA. METHODS: An iterative, three-phase program development process was employed using a mixed methods approach. The initial phase involved establishment of a multidisciplinary panel that informed decisions on key messages, program content, format, and delivery modes. These decisions were based on scientific evidence and guided by behavioural theories. The second phase comprised the development of the intervention package, identifying existing information and developing new material to fill identified gaps. The third phase involved refining and finalising the material via feedback from panel members, stakeholders, and community members. RESULTS: Through this approach, we collaboratively developed a comprehensive evidence-based education and training package consisting of a digital intervention supplemented with free access to in-person education and training. The package was designed to teach community members the specific steps in recognising and responding to a cardiac arrest, while addressing commonly known barriers and fears related to bystander response. The tailored program and delivery format addressed the needs of individuals of diverse ages, cultural backgrounds, and varied training needs and preferences. CONCLUSION: The study highlights the importance of community engagement in intervention development and demonstrates the need of evidence-based and collaborative approaches in creating a comprehensive, localised, relatively low-cost intervention package to improve bystander response to OHCA.

3. BMC Emerg Med. 2022 Aug 26;22(1):149. doi: 10.1186/s12873-022-00704-7.

A modified Delphi approach to determine current treatment advances for the development of a resuscitation program for maternal cardiac arrest.

Shields AD(1), Battistelli JD(2), Kavanagh LB(1), Thomson BA(3), Nielsen PE(1).

ABSTRACT

OBJECTIVE: Maternal cardiac arrest is a rare and complex process requiring pregnancy-specific responses and techniques. The goals of this study were to (1) identify, evaluate, and determine the most current best practices to treat this patient population and (2) establish a standardized set of guidelines to serve as a foundation for a future educational simulation-based curriculum. **STUDY DESIGN:** We used a three-step modified Delphi process to achieve consensus. Twenty-two healthcare experts from across North America agreed to participate in the expert panel. In round 1, 12 pregnancy-specific best practice statements were distributed to the expert panel. Panelists anonymously ranked these using a 7-point Likert scale and provided feedback. Round 2 consisted of a face-to-face consensus meeting where statements that had not already achieved consensus were discussed and then subsequently voted upon by the panelists. **RESULTS:** Through two rounds, we achieved consensus on nine evidence-based pregnancy-specific techniques to optimize response to maternal cardiac arrest. Round one resulted in one of the 12 best practice statements achieving consensus. Round two resulted in six of the remaining 12 gaining consensus. Best practice techniques involved use of point-of care ultrasound, resuscitative cesarean delivery, cardiopulmonary resuscitation techniques, and the use of extracorporeal cardiopulmonary resuscitation. **CONCLUSION:** The results of this study provide the foundation to develop an optimal, long-term strategy to treat cardiac arrest in pregnancy. We propose these nine priorities for standard practice, curricula, and guidelines to treat maternal cardiac arrest and hope they serve as a foundation for a future educational curriculum.

4. Clin J Sport Med. 2022 Aug 19. doi: 10.1097/JSM.0000000000001062. Online ahead of print.

Emergency Preparedness for Sudden Cardiac Arrest in Amateur Athletic Union Basketball Teams: An Opportunity to Improve Outcomes in Higher Risk Athletes.

Mason Z(1), Watson AM(2), Drezner JA(3).

ABSTRACT

OBJECTIVE: To examine sudden cardiac arrest (SCA) awareness and emergency preparedness for SCA in Amateur Athletic Union (AAU) youth basketball teams. **DESIGN:** Cross-sectional survey of AAU coaches and administrators. **SETTING:** Random sampling of AAU club teams across the United States. **PARTICIPANTS:** AAU club coaches and/or administrators. **INTERVENTIONS:** Electronic survey (Qualtrics) accessed online and by cell phone. Each coach/administrator was invited to participate via email up to 3 times, spaced approximately 5 days apart. **MAIN OUTCOME MEASURES:** Established and practiced emergency action plan (EAP), cardiopulmonary resuscitation (CPR) training, and automated external defibrillator (AED) access. **RESULTS:** A total of 53/449 (12%) respondents completed the survey. Only 6% of responding AAU clubs had a written EAP and practiced it on an annual basis. Only 35% of clubs required CPR training for their coaches. Automated external defibrillator were available at practices and games in only 45% and 35% of AAU clubs, respectively. Over 50% of clubs did not have an affiliated athletic trainer or medical director. **CONCLUSION:** The vast majority of AAU clubs in this study lack proper emergency preparedness for SCA. Given male basketball players are at highest risk of SCA compared with other young athlete populations, urgent interventions are needed to improve awareness, standardize training, establish EAPs, and ensure access to AEDs in AAU clubs.

5. Medicina (Kaunas). 2022 Aug 10;58(8):1073. doi: 10.3390/medicina58081073.

Basic Life Support Knowledge among Junior Medical and Dental Students, Communication Channels, and the COVID-19 Pandemic.

Ricci G(1), Herren T(1), Taramarcaz V(1), Schnetzler N(1), Dupuis F(2), Schiffer E(3), Suppan M(3), Suppan L(1).

ABSTRACT

Background and objective: The prognosis of cardiac arrest victims strongly depends on the prompt provision of Basic Life Support (BLS) maneuvers. Medical students should therefore be proficient in this area, but many lack essential BLS knowledge. The goal of this prospective, closed web-based study was to determine whether a short intervention designed to motivate first-year medical students to follow a blended BLS course could lead to a significant improvement in BLS knowledge in the following year. **Materials and Methods:** A fully automated web-based questionnaire was administered to second-year medical students one year after they had been given the opportunity of following a blended BLS course (e-learning and practice session). The primary outcome was the difference, on a 6-question score assessing essential BLS knowledge, between these students and those from the 2020 promotion since the latter had not been offered the optional BLS course. **Results:** The score was similar between the two study periods (3.3 ± 0.8 in 2022 vs. 3.0 ± 1.0 in 2020, $p = 0.114$), but no firm conclusion could be drawn since participation was much lower than expected (17.9% in 2022 vs. 43.7% in 2020, $p \leq 0.001$). Therefore, a second questionnaire was created and administered to understand the reasons underlying this low participation. **Conclusions:** There was a lack of improvement in BLS knowledge in second-year medical students after the introduction of an optional introductory BLS course in the first-year curriculum, but the limited participation rate precludes drawing definitive conclusions. Ineffective communication appears to be the cause of this low participation rate, but a lack of motivation in the aftermath of the COVID-19 pandemic cannot be ruled out. Corrective actions should be considered to enhance communication, restore motivation, and ultimately improve BLS knowledge among medical and dental students.

POST-CARDIAC ARREST TREATMENTS

1. N Engl J Med. 2022 Aug 27. doi: 10.1056/NEJMoa2208686. Online ahead of print.

Oxygen Targets in Comatose Survivors of Cardiac Arrest.

Schmidt H(1), Kjaergaard J(1), Hassager C(1), Mølstrøm S(1), Grand J(1), Borregaard B(1), Roelsgaard Obling LE(1), Venø S(1), Sarkisian L(1), Mamaev D(1), Jensen LO(1), Nyholm B(1), Høfsten DE(1), Josiassen J(1), Thomsen JH(1), Thune JJ(1), Lindholm MG(1), Stengaard Meyer MA(1), Winther-Jensen M(1), Sørensen M(1), Frydland M(1), Beske RP(1), Frikke-Schmidt R(1), Wiberg S(1), Boesgaard S(1), Lind Jørgensen V(1), Møller JE(1).

ABSTRACT

BACKGROUND: The appropriate oxygenation target for mechanical ventilation in comatose survivors of out-of-hospital cardiac arrest is unknown. **METHODS:** In this randomized trial with a 2-by-2 factorial design, we randomly assigned comatose adults with out-of-hospital cardiac arrest in a 1:1 ratio to either a restrictive oxygen target of a partial pressure of arterial oxygen (Pao₂) of 9 to 10 kPa (68 to 75 mm Hg) or a liberal oxygen target of a Pao₂ of 13 to 14 kPa (98 to 105 mm Hg); patients were also assigned to one of two blood-pressure targets (reported separately). The primary outcome was a composite of death from any cause or hospital discharge with severe disability or coma (Cerebral Performance Category [CPC] of 3 or 4; categories range from 1 to 5, with higher values indicating more severe disability), whichever occurred first within 90 days after randomization. Secondary outcomes were neuron-specific enolase levels at 48 hours, death from any cause, the score on the Montreal Cognitive Assessment (ranging from 0 to 30, with higher scores indicating better cognitive ability), the score on the modified Rankin scale (ranging from 0 to 6, with higher scores indicating greater disability), and the CPC at 90 days. **RESULTS:** A total of 789 patients underwent randomization. A primary-outcome event occurred in 126 of 394 patients (32.0%) in the restrictive-target group and in 134 of 395 patients (33.9%) in the liberal-target group (hazard ratio, 0.95; 95% confidence interval, 0.75 to 1.21; $P = 0.69$). At 90 days, death had occurred in 113 patients (28.7%) in the restrictive-target group and in 123 (31.1%) in the liberal-target group. On the CPC, the median category was 1 in the two groups; on the modified Rankin scale, the median score was 2 in

the restrictive-target group and 1 in the liberal-target group; and on the Montreal Cognitive Assessment, the median score was 27 in the two groups. At 48 hours, the median neuron-specific enolase level was 17 µg per liter in the restrictive-target group and 18 µg per liter in the liberal-target group. The incidence of adverse events was similar in the two groups. **CONCLUSIONS:** Targeting of a restrictive or liberal oxygenation strategy in comatose patients after resuscitation for cardiac arrest resulted in a similar incidence of death or severe disability or coma.

2. N Engl J Med. 2022 Aug 27. doi: 10.1056/NEJMoa2208687. Online ahead of print.

Blood-Pressure Targets in Comatose Survivors of Cardiac Arrest.

Kjaergaard J(1), Møller JE(1), Schmidt H(1), Grand J(1), Mølstrøm S(1), Borregaard B(1), Venø S(1), Sarkisian L(1), Mamaev D(1), Jensen LO(1), Nyholm B(1), Høfsten DE(1), Josiassen J(1), Thomsen JH(1), Thune JJ(1), Obting LER(1), Lindholm MG(1), Frydland M(1), Meyer MAS(1), Winther-Jensen M(1), Beske RP(1), Frikke-Schmidt R(1), Wiberg S(1), Boesgaard S(1), Madsen SA(1), Jørgensen VL(1), Hassager C(1).

ABSTRACT

BACKGROUND: Evidence to support the choice of blood-pressure targets for the treatment of comatose survivors of out-of-hospital cardiac arrest who are receiving intensive care is limited. **METHODS:** In a double-blind, randomized trial with a 2-by-2 factorial design, we evaluated a mean arterial blood-pressure target of 63 mm Hg as compared with 77 mm Hg in comatose adults who had been resuscitated after an out-of-hospital cardiac arrest of presumed cardiac cause; patients were also assigned to one of two oxygen targets (reported separately). The primary outcome was a composite of death from any cause or hospital discharge with a Cerebral Performance Category (CPC) of 3 or 4 within 90 days (range, 0 to 5, with higher categories indicating more severe disability; a category of 3 or 4 indicates severe disability or coma). Secondary outcomes included neuron-specific enolase levels at 48 hours, death from any cause, scores on the Montreal Cognitive Assessment (range, 0 to 30, with higher scores indicating better cognitive ability) and the modified Rankin scale (range, 0 to 6, with higher scores indicating greater disability) at 3 months, and the CPC at 3 months. **RESULTS:** A total of 789 patients were included in the analysis (393 in the high-target group and 396 in the low-target group). A primary-outcome event occurred in 133 patients (34%) in the high-target group and in 127 patients (32%) in the low-target group (hazard ratio, 1.08; 95% confidence interval [CI], 0.84 to 1.37; P = 0.56). At 90 days, 122 patients (31%) in the high-target group and 114 patients (29%) in the low-target group had died (hazard ratio, 1.13; 95% CI, 0.88 to 1.46). The median CPC was 1 (interquartile range, 1 to 5) in both the high-target group and the low-target group; the corresponding median modified Rankin scale scores were 1 (interquartile range, 0 to 6) and 1 (interquartile range, 0 to 6), and the corresponding median Montreal Cognitive Assessment scores were 27 (interquartile range, 24 to 29) and 26 (interquartile range, 24 to 29). The median neuron-specific enolase level at 48 hours was also similar in the two groups. The percentages of patients with adverse events did not differ significantly between the groups. **CONCLUSIONS:** Targeting a mean arterial blood pressure of 77 mm Hg or 63 mm Hg in patients who had been resuscitated from cardiac arrest did not result in significantly different percentages of patients dying or having severe disability or coma.

3. Pol Arch Intern Med. 2022 Aug 23:16325. doi: 10.20452/pamw.16325. Online ahead of print.

A nomogram to predict in-hospital mortality in patients with post-cardiac arrest: a retrospective cohort study.

Chen J, Mei Z, Wang Y, Shou X, Zeng R, Chen Y, Liu Q.

ABSTRACT

INTRODUCTION: Nomograms of prognosis in patients with post-cardiac arrest (CA) have been established. However, there are some shortcomings and interference in clinical application. **OBJECTIVES:** Our study aimed at developing a utility nomogram to predict the risk of in-hospital death in patients with post-CA. **PATIENTS AND METHODS:** We retrospectively extracted data from

the MIMIC-IV database. Lasso logistic regression and multivariable logistic regression investigated independent risk factors. A nomogram defined as a prediction model was established on these independent risk factors. Model performance was measured by examining discrimination (ROC: receiver operating characteristic curve), calibration (calibration curve analysis), and utility (DCA: decision curve analysis). RESULTS: 1724 patients with post-CA, 788 survived and 936 died, were enrolled in our study. The incidence of in-hospital death is 54.3%. In this nomogram, predictors were age, malignant cancer, bicarbonate, BUN, sodium, heart rate, respiratory rate, temperature, SPO₂, norepinephrine prescription, and lactate. The internally validated nomogram showed good discrimination (ROC 0.801; 95% CI 0.775-0.835). Calibration curve analysis and DCA confirmed that this prediction model has a good clinical application. CONCLUSIONS: We established a risk prediction model on the use of admission characteristics to accurately predict the clinical outcome in patients with post-CA. The nomogram might help in risk identification and individual clinical intervention.

TARGETED TEMPERATURE MANAGEMENT

No articles identified.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. Resusc Plus. 2022 Aug 10;11:100283. doi: 10.1016/j.resplu.2022.100283. eCollection 2022 Sep. **Lay rescuer use of automated external defibrillators in infants, children and adolescents: A systematic review.**

Atkins DL(1), Acworth J(2)(3), Chung SP(4), Reis A(5), Van de Voorde P(6)(7); International Liaison Committee on Resuscitation (ILCOR) Pediatric and Basic Life Support Task Forces.

ABSTRACT

IMPORTANCE: Automated external defibrillator (AED) use is increasing, but use in children is uncommon. A growing literature of use in children by lay rescuers warrants review. OBJECTIVE: A systematic review of AED effectiveness in children experiencing out-of-hospital cardiac arrest (OHCA). DATA SOURCES: PubMed, EMBASE, Cochrane Register of Controlled Trials. STUDY SELECTION: Children, ages 0-18, experiencing OHCA with an AED applied by a lay rescuer. Control population: children with no AED application. DATA EXTRACTION AND SYNTHESIS: Results are reported according to PRISMA guidelines. Two authors independently reviewed all titles and abstracts of references identified by the search strategy, then generated a subset which all authors reviewed. MAIN OUTCOMES AND MEASURES: Critical outcomes were survival with Cerebral Performance Category (CPC) 1-2 at hospital discharge or 30 days and survival to hospital discharge. RESULTS: Population: age categories: <1 year, 1-12 years, 13-18 years. Lay rescuer AED application resulted in improved survival with CPC 1-2 at hospital discharge or 30 days to hospital discharge in age groups 1-12 and 13-18 years (RR 3.84 [95 % CI 2.69-5.5], RR 3.75 [95 %CI 2.97-4.72]), respectively and hospital discharge in both groups(RR 3.04 [95 % CI 2.18-4.25], RR 3.38 [95 % CI 2.17-4.16]), respectively. AED use with CPR improved CPC 1-2 at hospital discharge and hospital discharge (RR 1.49 [95 % CI 1.11-1.97], RR 1.55[1.12-2.12]). CONCLUSIONS: AED application by lay rescuers is associated with improved survival with a CPC of 1-2 at 30 days, and improved survival to hospital discharge for children 1-18 years. There are limited data for children < 1 year.

PEDIATRICS AND CHILDREN

1. Neurology. 2022 Aug 26;10.1212/WNL.000000000201189. doi: 10.1212/WNL.000000000201189. Online ahead of print.

Association Between Quantitative Diffusion Weighted Magnetic Resonance Neuroimaging and Outcome After Pediatric Cardiac Arrest.

Kirschen MP(1), Berman JI(2), Liu H(3), Ouyang M(2), Mondal A(3), Griffis H(3), Levow C(4), Winters M(4), Lang SS(5), Huh J(4), Huang H(2), Berg RA(4), Vossough A(2), Topjian A(4).

ABSTRACT

BACKGROUND AND OBJECTIVES: Diffusion magnetic resonance imaging (MRI) can quantify extent of hypoxic-ischemic brain injury after cardiac arrest. Our objective was to determine the association between adult-derived threshold of apparent diffusion coefficient (ADC) $<650 \times 10^{-6} \text{mm}^2/\text{s}$ in $>10\%$ of brain tissue and unfavorable outcome after pediatric cardiac arrest. Since ADC decreases exponentially as a function of increasing age, we determined association 1) having $>10\%$ of brain tissue below a novel age-dependent ADC threshold, and 2) age-normalized whole brain mean ADC and unfavorable outcome. **METHODS:** Retrospective study of patients ≤ 18 years old who had cardiac arrest and a clinically obtained brain MRI within 7 days. Primary outcome was unfavorable neurologic status at hospital discharge based on Pediatric Cerebral Performance Category (PCPC) score. ADC images were extracted from three-direction diffusion imaging. We determined whether each patient had $>10\%$ of voxels with ADC below prespecified thresholds. We computed whole brain mean ADC for each patient. **RESULTS:** One-hundred-thirty-four patients were analyzed. Patients with ADC $<650 \times 10^{-6} \text{mm}^2/\text{s}$ in $>10\%$ of voxels had 15 times higher odds (95%CI 5, 65) of unfavorable outcome compared to patients with ADC $<650 \times 10^{-6} \text{mm}^2/\text{s}$ (AUROC 0.72 [95%CI 0.63, 0.80]). This ADC criteria had a sensitivity and specificity of 0.49 and 0.94, and positive and negative predictive values of 0.93 and 0.52 for unfavorable outcome. The age-dependent ADC threshold that yielded optimal sensitivity and specificity for unfavorable outcome was $<300 \times 10^{-6} \text{mm}^2/\text{s}$ below each patient's predicted whole brain mean ADC. The sensitivity, specificity, positive and negative predictive values for this ADC threshold were 0.53, 0.96, 0.96, and 0.54, respectively (OR: 26.4 [95%CI 7.5, 168.3]; AUROC 0.74 [95%CI 0.66, 0.83]). Lower age-normalized whole brain mean ADC was also associated with unfavorable outcome (OR 0.42 [0.24, 0.64], AUROC 0.76 [95%CI 0.66, 0.82]). **DISCUSSION:** Quantitative diffusion thresholds on MRI within 7 days after cardiac arrest were associated with unfavorable outcome in children. Age-independent ADC threshold was highly specific for predicting unfavorable outcome. However, specificity and sensitivity increased when using age-dependent ADC thresholds. Age-dependent ADC thresholds may improve prognostic accuracy and require further investigation in larger cohorts. **CLASSIFICATION OF EVIDENCE:** This study provides Class III evidence that quantitative diffusion-weighted imaging (DWI) within 7 days post-arrest can predict an unfavorable clinical outcome in children.

EXTRACORPOREAL LIFE SUPPORT

1. Interact Cardiovasc Thorac Surg. 2022 Aug 24;ivac219. doi: 10.1093/icvts/ivac219. Online ahead of print.

Systematic review and Meta-analysis comparing low-flow duration of extracorporeal and conventional cardiopulmonary resuscitation.

Mandigers L(1)(2), Boersma E(3), den Uil CA(1)(3)(4), Gommers D(1), Bělohávek J(5), Belliato M(6), Lorusso R(7), Dos Reis Miranda D(1).

ABSTRACT

OBJECTIVES: After cardiac arrest, a key factor determining survival outcomes is low-flow duration. Our aims were to determine the relation of survival and low-flow duration of extracorporeal

cardiopulmonary resuscitation and conventional cardiopulmonary resuscitation and if these two therapies have different short term survival curves in relation to low-flow duration. **METHODS:** We searched Embase, Medline, Web of Science, and Google Scholar from inception up to April 2021. A linear mixed effect model was used to describe the course of survival over time, based on study-specific and time-specific aggregated survival data. **RESULTS:** We included 42 observational studies reporting on 1,689 extracorporeal cardiopulmonary resuscitation and 375,751 conventional cardiopulmonary resuscitation procedures. Of the included studies, 25 included adults, 13 included children, and four included both. In adults, survival curves decline rapidly over time (extracorporeal cardiopulmonary resuscitation 37.2%-29.8%-23.8%-19.1% versus conventional cardiopulmonary resuscitation-shockable 36.8%-7.2%-1.4%-0.3% for 15-30-45-60 min low-flow, respectively). extracorporeal cardiopulmonary resuscitation was associated with a statistically significant slower decline in survival than conventional cardiopulmonary resuscitation with initial shockable rhythms (conventional cardiopulmonary resuscitation-shockable). In children, survival curves decline rapidly over time (extracorporeal cardiopulmonary resuscitation 43.6%-41.7%-39.8%-38.0% versus CCPR-shockable 48.6%-20.5%-8.6%-3.6% for 15-30-45-60 min low-flow, respectively). extracorporeal cardiopulmonary resuscitation was associated with a statistically significant slower decline in survival than conventional cardiopulmonary resuscitation-shockable. **CONCLUSIONS:** The short-term survival of extracorporeal cardiopulmonary resuscitation and conventional cardiopulmonary resuscitation-shockable patients both decline rapidly over time, in adults as well as in children. This decline of short-term survival in relation to low-flow duration in extracorporeal cardiopulmonary resuscitation was slower than in conventional cardiopulmonary resuscitation.

2. J Am Heart Assoc. 2022 Aug 24:e024642. doi: 10.1161/JAHA.121.024642. Online ahead of print.

Use of Percutaneous Atrioseptostomy for Left Heart Decompression During Venous-Arterial Extracorporeal Membrane Oxygenation Support: An Observational Study.

Delmas C(1)(2), Vallee L(3), Bouisset F(2), Porterie J(4), Biendel C(1)(2), Lairez O(2), Crognier L(3), Marcheix B(4), Conil JM(3), Maury P(2), Minville V(3).

ABSTRACT

Background Left ventricular overload is frequent under venous-arterial extracorporeal membrane oxygenation, which is associated with a worsening of the prognosis of these patients. Several left heart decompression (LHD) techniques exist. However, there is no consensus on their timing and type. We aimed to describe characteristics and outcomes of patients undergoing LHD and to compare percutaneous atrioseptostomy (PA) to other LHD techniques. **Methods and Results** Retrospective analysis was conducted of consecutive and prospectively collected patients supported by venous-arterial extracorporeal membrane oxygenation for refractory cardiac arrest or cardiogenic shock between January 2015 and April 2018, with a 90-day follow-up in our tertiary center. Patients were divided according to the presence of LHD, and then according to its type (PA versus others). Thirty-nine percent (n=63) of our patients (n=163) required an LHD. Patients with LHD had lower left ventricular ejection fraction, more ischemic cardiomyopathy, and no drug intoxication-associated cardiogenic shock. PA was frequently used for LHD (41% of first-line and 57% of second-line LHD). PA appears safe and fast to realize (6.3 [interquartile range, 5.8-10] minutes) under fluoroscopic and echocardiographic guidance, with no acute complications. PA was associated with fewer neurological complications (12% versus 38%, P=0.02), no need to insert a second LHD (0% versus 19%, P=0.04), and higher 90-day survival compared with other techniques (42% versus 19%, log-rank test P=0.02), despite more sepsis (96% versus 73%, P=0.02) and blood transfusions (13.5% versus 7%, P=0.01). Multivariate analysis confirms the association between PA and 90-day survival (hazard ratio, 2.53 [1.18-5.45], P=0.019). **Conclusions** LHD was frequently used for patients supported with venous-arterial extracorporeal membrane oxygenation, especially in cases of ischemic cardiomyopathy and low left ventricular ejection fraction. PA seems to be a safe and efficient LHD technique associated with greater mid-term survival justifying the pursuit of research on this topic.

3. Acad Emerg Med. 2022 Aug 24. doi: 10.1111/acem.14585. Online ahead of print.

Extracorporeal membrane oxygenation versus conventional rewarming for severe hypothermia in an urban emergency department.

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ABSTRACT

BACKGROUND: Severe hypothermia (core body temperature < 28 degrees Celsius [°C]) is life-threatening and predisposes to cardiac arrest. The comparative effectiveness of different active internal rewarming methods in an urban U.S. population is unknown. We aim to compare outcomes between hypothermic emergency department (ED) patients rewarmed conventionally using an intravascular rewarming catheter or warm fluid lavage versus those rewarmed using extracorporeal membrane oxygenation (ECMO). **METHODS:** We performed a retrospective cohort analysis of adults with severe hypothermia due to outdoor exposure presenting to an urban ED in Minnesota, 2007-2021. The primary outcome was hospital survival. We also calculated the rewarming rate in the 4 hours after ED arrival and compared these data between patients rewarmed with ECMO (the extracorporeal rewarming group) versus without ECMO (the conventional rewarming group). We repeated these analyses in the subgroup of patients with cardiac arrest. **RESULTS:** We analyzed 44 hypothermic ED patients: 25 patients in the extracorporeal rewarming group (median temperature 24.1 °C; 84% with cardiac arrest) and 19 patients in the conventional rewarming group (median temperature 26.3 °C; 37% with cardiac arrest; 89% received an intravascular rewarming catheter). The median rewarming rate was greater in the extracorporeal vs. conventional group (2.3 vs. 1.5 °C/hour, absolute difference 0.8 °C/hour, 95% confidence interval [CI] 0.3-1.2 °C/hour) yet hospital survival was similar (68% vs. 74%). Among patients with cardiac arrest, hospital survival was greater in the extracorporeal vs. conventional group (71% vs. 29%, absolute difference 42%, 95% CI 4 - 82%). **CONCLUSION:** Among ED patients with severe hypothermia and cardiac arrest, survival was significantly higher with ECMO vs. conventional rewarming. Among all hypothermic patients, ECMO use was associated with faster rewarming than conventional methods.

EXPERIMENTAL RESEARCH

1. J Clin Med. 2022 Aug 22;11(16):4921. doi: 10.3390/jcm11164921.

High PEEP Levels during CPR Improve Ventilation without Deleterious Haemodynamic Effects in Pigs.

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ABSTRACT

BACKGROUND: Invasive ventilation during cardiopulmonary resuscitation (CPR) is very complex due to unique thoracic pressure conditions. Current guidelines do not provide specific recommendations for ventilation during ongoing chest compressions regarding positive end-expiratory pressure (PEEP). This trial examines the cardiopulmonary effects of PEEP application during CPR. **METHODS:** Forty-two German landrace pigs were anaesthetised, instrumented, and randomised into six intervention groups. Three PEEP levels (0, 8, and 16 mbar) were compared in high standard and ultralow tidal volume ventilation. After the induction of ventricular fibrillation, mechanical chest compressions and ventilation were initiated and maintained for thirty minutes. Blood gases, ventilation/perfusion ratio, and electrical impedance tomography loops were taken repeatedly. Ventilation pressures and

haemodynamic parameters were measured continuously. Postmortem lung tissue damage was assessed using the diffuse alveolar damage (DAD) score. Statistical analyses were performed using SPSS, and p values ≤ 0.05 were considered significant. RESULTS: The driving pressure (Pdrive) showed significantly lower values when using PEEP 16 mbar than when using PEEP 8 mbar ($p = 0.045$) or PEEP 0 mbar ($p \leq 0.001$) when adjusted for the ventilation mode. Substantially increased overall lung damage was detected in the PEEP 0 mbar group (vs. PEEP 8 mbar, $p = 0.038$; vs. PEEP 16 mbar, $p = 0.009$). No significant differences in mean arterial pressure could be detected. CONCLUSION: The use of PEEP during CPR seems beneficial because it optimises ventilation pressures and reduces lung damage without significantly compromising blood pressure. Further studies are needed to examine long-term effects in resuscitated animals.

2. Cell Mol Neurobiol. 2022 Aug 25. doi: 10.1007/s10571-022-01275-8. Online ahead of print.

Mild Hypothermia Alleviates Complement C5a-Induced Neuronal Autophagy During Brain Ischemia-Reperfusion Injury After Cardiac Arrest.

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ABSTRACT

After restoration of spontaneous circulation (ROSC) following cardiac arrest, complements can be activated and excessive autophagy can contribute to the brain ischemia-reperfusion (I/R) injury. Mild hypothermia (HT) protects against brain I/R injury after ROSC, but the mechanisms have not been fully elucidated. Here, we found that HT significantly inhibited the increases in serum NSE, S100 β , and C5a, as well as neurologic deficit scores, TUNEL-positive cells, and autophagic vacuoles in the pig brain cortex after ROSC. The C5a receptor 1 (C5aR1) mRNA and the C5a, C5aR1, Beclin 1, LC3-II, and cleaved caspase-3 proteins were significantly increased, but the P62 protein and the PI3K/Akt/mTOR pathway-related proteins were significantly reduced in pigs after ROSC or neuronal oxygen-glucose deprivation/reoxygenation. HT could significantly attenuate the above changes in NT-treated neurons. Furthermore, C5a treatment induced autophagy and apoptosis and reduced the PI3K/Akt/mTOR pathway-related proteins in cultured neurons, which could be reversed by C5aR1 antagonist PMX205. Our findings demonstrated that C5a could bind to C5aR1 to induce neuronal autophagy during the brain I/R injury, which was associated with the inhibited PI3K/Akt/mTOR pathway. HT could inhibit C5a-induced neuronal autophagy by regulating the C5a-C5aR1 interaction and the PI3K/Akt/mTOR pathway, which might be one of the neuroprotective mechanisms underlying I/R injury. The C5a receptor 1 (C5aR1) mRNA and the C5a, C5aR1, Beclin 1, LC3-II, and cleaved caspase-3 proteins were significantly increased, but the P62 protein and the PI3K/Akt/mTOR pathway-related proteins were significantly reduced in pigs after ROSC or neuronal oxygen-glucose deprivation/reoxygenation. Mild hypothermia (HT) could significantly attenuate the above changes in NT-treated neurons. Furthermore, C5a treatment induced autophagy and apoptosis and reduced the PI3K/Akt/mTOR pathway-related proteins in cultured neurons, which could be reversed by C5aR1 antagonist PMX205. Proposed mechanism by which HT protects against brain I/R injury by repressing C5a-C5aR1-induced excessive autophagy. Complement activation in response to brain I/R injury generates C5a that can interact with C5aR1 to inactivate mTOR, probably through the PI3K-AKT pathway, which can finally lead to autophagy activation. The excessively activated autophagy ultimately contributes to cell apoptosis and brain injury. HT may alleviate complement activation

and then reduce C5a-induced autophagy to protect against brain I/R injury. HT, mild hypothermia; I/R, ischemia reperfusion.

3. Arch Dis Child Fetal Neonatal Ed. 2022 Sep;107(5):488-494. doi: 10.1136/archdischild-2021-322881. Epub 2021 Nov 29.

Single versus continuous sustained inflations during chest compressions and physiological-based cord clamping in asystolic lambs.

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ABSTRACT

BACKGROUND: The feasibility and benefits of continuous sustained inflations (SIs) during chest compressions (CCs) during delayed cord clamping (physiological-based cord clamping; PBCC) are not known. We aimed to determine whether continuous SIs during CCs would reduce the time to return of spontaneous circulation (ROSC) and improve post-asphyxial blood pressures and flows in asystolic newborn lambs. **METHODS:** Fetal sheep were surgically instrumented immediately prior to delivery at ~139 days' gestation and asphyxia induced until lambs reached asystole. Lambs were randomised to either immediate cord clamping (ICC) or PBCC. Lambs then received a single SI (SIsing; 30 s at 30 cmH₂O) followed by intermittent positive pressure ventilation, or continuous SIs (SIcont: 30 s duration with 1 s break). We thus examined 4 groups: ICC +SIsing, ICC +SIcont, PBCC +SIsing, and PBCC +SIcont. Chest compressions and epinephrine administration followed international guidelines. PBCC lambs underwent cord clamping 10 min after ROSC. Physiological and oxygenation variables were measured throughout. **RESULTS:** The time taken to achieve ROSC was not different between groups (mean (SD) 4.3±2.9 min). Mean and diastolic blood pressure was higher during chest compressions in PBCC lambs compared with ICC lambs, but no effect of SIs was observed. SIcont significantly reduced pulmonary blood flow, diastolic blood pressure and oxygenation after ROSC compared with SIsing. **CONCLUSION:** We found no significant benefit of SIcont over SIsing during CPR on the time to ROSC or on post-ROSC haemodynamics, but did demonstrate the feasibility of continuous SIs during advanced CPR on an intact umbilical cord. Longer-term studies are recommended before this technique is used routinely in clinical practice.

CASE REPORTS

1. Cureus. 2022 Jul 21;14(7):e27092. doi: 10.7759/cureus.27092. eCollection 2022 Jul.

Paroxysmal Atrioventricular Block: A Rare Cause of Cardiac Arrest.

Bosah AN(1), Pappan N(1), Nestasie M(2), Belden W(2), Thosani A(2).

ABSTRACT

Paroxysmal atrioventricular block (PAVB) is characterized by a sudden and unanticipated repetitive block of atrial impulses to the ventricles. It is often triggered by supraventricular and ventricular ectopic beats in patients with diseased His-Purkinje system. We present the case of a 69-year-old woman with a history of fascicular block who was admitted with gastrointestinal bleeding. Her hospital course was complicated by cardiac arrest. At the time of the loss of consciousness, telemetry tracings showed sudden onset high-grade second-degree atrioventricular (AV) block with a delayed escape rhythm resulting in a prolonged pause. Adult cardiac life support was necessary along with transvenous pacing until she ultimately underwent the placement of a permanent pacemaker. Thorough evaluation of electrocardiograms (EKGs) and telemetry allowed for accurate diagnoses and appropriate treatment of cardiac arrest secondary to paroxysmal AV block.

2. *Oxf Med Case Reports*. 2022 Aug 18;2022(8):omac084. doi: 10.1093/omcr/omac084. eCollection 2022 Aug.

Spontaneous innominate artery rupture in a patient with systemic sclerosis.

Ali S(1), DeVile M(2), Hughes R(1).

ABSTRACT

We present the case of a 57-year-old female with systemic sclerosis who presented in extremis to our hospital with an acute onset of right upper chest and neck pain with swelling. She deteriorated rapidly due to haemodynamic compromise from suspected bleeding and suffered a cardiac arrest with prolonged resuscitation. Emergency thoracotomy demonstrated an acute longitudinal tear of the innominate artery/brachiocephalic trunk at the junction of the subclavian and common carotid arteries. This is the first reported case of spontaneous arterial rupture in a patient with systemic sclerosis, and while direct causation is difficult to prove, her history of previous vascular complications with potential ongoing microvascular damage makes a contributory role likely.

3. *J Long Term Eff Med Implants*. 2022;32(4):1-6. doi: 10.1615/

JLongTermEffMedImplants.2022042027.

Is CT-A Always Reliable in Detecting Active Bleeding in Closed Pelvic Fractures? Management of a Case with Multiple Closed Pelvic Fratures and Internal Iliac Artery Bleeding.

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ABSTRACT

One of the most important complications of pelvic injuries is hemorrhage which can be attributed to the venus plexus of the pelvis, the damaged bone on the fracture site, or in 15% of cases to arterial cause. In the last case mortality could reach 70%. Clinical case presentation, a 77-year-old man, presented in the emergency department of our hospital hemodynamically unstable due to fall from height (3 meters) with comminuted bilateral fractures of the pubic rami, right sacral and iliac wing fracture, right acetabular fracture, fractures of transverse processes of the first, second, and fifth lumbar spine vertebrae and a periprotetic fracture of the right femur. Advanced trauma life support (ATLS) protocol was followed throughout. Computed tomography (CT) scans and CT angiography performed, showed the above mentioned pelvic fractures that did not require stabilization, without further injuries, and a well described retroperitoneal hematoma without any evidence of active bleeding. During the resuscitation process the patient developed cardiac arrest and cardiopulmonary resuscitation (CPR) protocol was followed. The patient was intubated and retained his cardiac rhythm. However, he remained unstable and an angiography was then performed that revealed internal iliac artery bleeding and embolism of the internal iliac artery was performed. The patient was stabilized and was transferred to the intensive care unit for further management. Arterial hemorrhage due to pelvic injury is less common, however presents with high rates of mortality. CT angiography may in some cases not reveal existing active bleeding, misleading the clinician. Therefore, in patients with high clinical suspicion of arterial pelvic hemorrhage who remain unstable during the initial resuscitation and do not present with other primary source of bleeding, an angiography and embolism should be performed as soon as possible.

4. *Medicina (Kaunas)*. 2022 Aug 18;58(8):1121. doi: 10.3390/medicina58081121.

Adult Respiratory Syncytial Virus Infection and Hypoxic Cardiac Arrest-Coexistent or Causal? A Hypothesis-Generating Case Report.

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ABSTRACT

Respiratory syncytial virus (RSV) is a well-known pathogen in paediatric patients. However, it also causes substantial morbidity and mortality in adults, posing a major healthcare problem. We present a patient with chronic pulmonary conditions and an acute RSV infection, thus leading to cardiac arrest (CA). We speculate that RSV as the causative agent for CA should be considered in post-resuscitation care. From a wider public health perspective, immuno-naivety for RSV caused by the coronavirus disease 2019 pandemic may induce a severe rise in cases, morbidity, and mortality in the future.

5. Crit Care Explor. 2022 Aug 19;4(8):e0747. doi: 10.1097/CCE.0000000000000747. eCollection 2022 Aug.

Bebtelovimab-Induced Bradycardia Leading to Cardiac Arrest.

Gearges C(1), Haider H(1), Rana V(1), Asghar Z(1), Kewalramani A(1), Kuschner Z(1)(2).

ABSTRACT

Bebtelovimab is a monoclonal antibody used to prevent progression of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Complications of SARS-CoV-2 infection can include cardiac effects including sinus bradycardia. CASE SUMMARY: We describe the case of an 86-year-old male infected with SARS-CoV-2 who experienced bradycardia with cardiac arrest immediately following infusion of Bebtelovimab with return of spontaneous circulation obtained following 1 minute of chest compressions and administration of atropine. His bradycardia resolved, and he was extubated on hospital day 1, found to be neurologically intact, and discharged on hospital day 9. CONCLUSIONS: Due to the time course of the patient's symptomatology, we attribute the bradycardic arrest to the Bebtelovimab infusion. This case illustrates the need for further research into the etiology of bradycardia due to SARS-CoV-2 infection and to examine potential links to monoclonal antibody infusion. It also serves as important caution to maintain close cardiac monitoring while administering monoclonal antibodies for SARS-CoV-2.

6. Heliyon. 2022 Aug 4;8(8):e10051. doi: 10.1016/j.heliyon.2022.e10051. eCollection 2022 Aug.

Malignant hyperthermia-like syndrome in acute chlorfenapyr poisoning - A case report.

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ABSTRACT

BACKGROUND: Chlorfenapyr is a pesticide that interferes with mitochondrial oxidative phosphorylation, resulting in the disruption of ATP production and cellular death. We present a fatal case of chlorfenapyr poisoning presented with malignant hyperthermia-like syndrome after intubation. CASE PRESENTATION: A 49-year-old male presented with fatigue and diaphoresis four days after ingesting emamectin chlorfenapyr. IV hydration was given, and two sessions of hemoperfusion were performed. He was intubated for airway protection on Day 3 because of drowsiness. Immediately after intubation, he developed tachycardia and hyperthermia (temperature 41 °C), followed by cardiac arrest. During resuscitation, we noted he had severe diaphoresis and generalized muscle rigidity. Peri-arrest ABG showed abrupt onset of severe type 2 respiratory failure, lactate acidosis, and hyperkalemia. The clinical manifestation and ABG result lead to the possible diagnosis of malignant hyperthermia. The resuscitation was unsuccessful, and the patient eventually passed away. Propofol might be the culprit drug in this case as it is known to affect mitochondrial metabolism via uncoupling oxidative phosphorylation. CONCLUSION: We suggest monitoring for signs and symptoms of malignant hyperthermia in chlorfenapyr poisoning, especially after intubation. Propofol should be avoided or used with caution during induction for intubation. Further research on the possible antidote and usage of early RRT in ED is needed.