This week's PubMed 15th – 21st May 2022: articles of interest n = 47

CPR AND COVID-19

1. BMC Emerg Med. 2022 May 18;22(1):85. doi: 10.1186/s12873-022-00628-2.
Observational study on implications of the COVID-19-pandemic for cardiopulmonary resuscitation in out-of-hospital cardiac arrest: qualitative and quantitative insights from a model region in Germany.
Damjanovic D(#)(1), Pooth JS(#)(2), Steger R(3), Boeker M(4), Steger M(3), Ganter J(2), Hack T(2), Baldas K(5), Biever PM(6), Schmitz D(5), Busch HJ(3), Müller MP(5), Trummer G(2), Schmid B(3).
ABSTRACT
BACKGROUND: The city of Freiburg has been among the most affected regions by the COVID-19 pandemic in Germany. In out of hospital cardiac arrest (OHCA) care, all parts of the rescue system were exposed to profound infrastructural changes. We aimed to provide a comprehensive overview of these changes in the resuscitation landscape in the Freiburg region. METHODS: Utstein-style quantitative data on OHCA with CPR initiated, occurring in the first pandemic wave between February 27th, 2020 and April 30th, 2020 were compared to the same time periods between 2016 and 2019. Additionally, qualitative changes in the entire rescue system were analyzed and described. RESULTS: Incidence of OHCA with attempted CPR did not significantly increase during the pandemic period (11.1/100.000 inhabitants/63 days vs 10.4/100.000 inhabitants/63 days, p = 1.000). In witnessed cases, bystander-CPR decreased significantly from 57.7% (30/52) to 25% (4/16) (p = 0.043). A severe pre-existing condition (PEC) was documented more often, 66.7% (16/24) vs 38.2% (39/102) there were longer emergency medical services (EMS) response times, more resuscitation attempts terminated on scene, 62.5% (15/24) vs. 34.3% (35/102) and less patients transported to hospital (p = 0.019). Public basic life support courses, an app-based first-responder alarm system, Kids Save Lives activities and a prehospital extracorporeal CPR (eCPR) service were paused during the peak of the pandemic. CONCLUSION: In our region, bystander CPR in witnessed OHCA cases as well as the number of patients transported to hospital significantly decreased during the first pandemic wave. Several important parts of the resuscitation landscape were paused. The COVID-19 pandemic impedes OHCA care, which leads to additional casualties. Countermeasures should be taken.

2. Am J Emerg Med. 2022 Jun;56:271-274. doi: 10.1016/j.ajem.2021.07.012. Epub 2021 Jul 8.
Bystander cardiopulmonary resuscitation in public locations before and after the coronavirus disease 2019 pandemic in the Republic of Korea.
Lim KT(1), Ahn KO(2), Park JH(3), Park CH(4), Lim J(4), Lee K(4).
NO ABSTRACT AVAILABLE

CPR/MECHANICAL CHEST COMPRESSION

1. Resusc Plus. 2022 May 11;10:100242. doi: 10.1016/j.resplu.2022.100242. eCollection 2022 Jun.
Chest wall mechanics during mechanical chest compression and its relationship to CPR-related injuries and survival.
Azeli Y(1)(2)(3), Barbería E(4)(5), Fernández A(6), García-Vilana S(7), Bardají A(5)(8), Hardig BM(9).
ABSTRACT
AIM: To determine compression force variation (CFV) during mechanical cardiopulmonary resuscitation (CPR) and its relationship with CPR-related injuries and survival. METHODS: Adult non-

traumatic OHCA patients who had been treated with mechanical CPR were evaluated for CPR-related injuries using chest X-rays, thoracic computed tomography or autopsy. The CFV exerted by the LUCAS 2 device was calculated as the difference between the maximum and the minimum force values and was categorised into three different groups (high positive CFV ≥ 95 newton (N), high negative CFV ≤ -95 N, and low variation for intermediate CFV). The CFV was correlated with the CPR injuries findings and survival data. RESULTS: Fifty-two patients were included. The median (IQR) age was 57 (49-66) years, and 13 (25%) cases survived until hospital admission. High positive CFV was found in 21 (40.4%) patients, high negative CFV in 9 (17.3%) and a low CFV in 22 (42.3%). The median (IQR) number of rib fractures was higher in the high positive and negative CFV groups compared with the low CFV group [7(1-9) and 9 (4-11) vs 0 (0-6) ($p = 0.021$)]. More bilateral fracture cases were found in the high positive and negative CFV groups [16 (76.2%) and 6 (66.7%) vs 6 (27.3%) ($p = 0.004$)]. In the younger half of the sample more patients survived until hospital admission in the low CFV group compared with the high CFV groups [5 (41.7%) vs 1 (7.1%) ($p = 0.037$)]. CONCLUSIONS: High CFV was associated with ribcage injuries. In the younger patients low CFV was associated with survival until hospital admission.

2. Air Med J. 2022 May-Jun;41(3):303-307. doi: 10.1016/j.amj.2022.02.002. Epub 2022 Mar 11.
Automated Versus Manual Cardiopulmonary Resuscitation in Flight: Are We Being Safe?
Frascone R(1), Pasquarella J(2), Hartigan M(3), Pasquarella C(3), Rupp P(4), Wewerka S(4).
ABSTRACT
OBJECTIVE: The primary purpose of this study was to compare the percentage of return of spontaneous circulation of in-flight cardiac arrest (IFCA) patients on admission to the emergency department (ED) who received in-flight standard cardiopulmonary resuscitation (s-CPR) versus automated cardiopulmonary resuscitation (a-CPR). SETTING: EMS helicopter (HEMS) service in Midwest USA. METHODS: This was a prospective, consecutive case series of adult patients who had IFCA of any cause managed with a-CPR between October 1, 2012, and February 8, 2016 (40 months), at a helicopter emergency medical service (HEMS) in the Midwestern United States. The series was compared with a historical control of patients who had IFCA managed by s-CPR between June 1, 2009, and September 30, 2012 (40 months). RESULTS: Ninety-five runs (39 s-CPR and 54 a-CPR) were included. There was no significant difference in survival between the 2 groups upon HEMS leaving the ED. Cardiopulmonary resuscitation was performed for a significantly longer period of time in the a-CPR cohort than in the s-CPR cohort, and a significantly higher percentage of patients were undergoing active compressions upon loading into the aircraft in the a-CPR cohort. CONCLUSION: There was no difference in return of spontaneous circulation on ED admission between the 2 compression methodologies. In-flight use of a-CPR allows HEMS providers to be safe and compliant with Federal Aviation Administration regulations. It also meets the public and medical profession's expectations of the treatment of IFCA with high-quality cardiopulmonary resuscitation by HEMS.

REGISTRIES, REVIEWS AND EDITORIALS

1. Resusc Plus. 2022 May 9;10:100241. doi: 10.1016/j.resplu.2022.100241. eCollection 2022 Jun.
CPR-related cognitive activity, consciousness, awareness and recall, and its management: A scoping review.
West RL(1), Otto Q(1), Drennan IR(2)(3), Rudd S(1), Böttiger BW(4), Parnia S(5), Soar J(1).
ABSTRACT
BACKGROUND: There are increasing numbers of reports of cognitive activity, consciousness, awareness and recall related to cardiopulmonary resuscitation (CPR) and interventions such as the use of sedative and analgesic drugs during CPR. OBJECTIVES: This scoping review aims to describe

the available evidence concerning CPR-related cognitive activity, consciousness, awareness and recall and interventions such as the use of sedative and analgesic drugs during CPR. METHODS: A literature search was conducted of Medline, Embase and CINAHL from inception to 21 October 2021. We included case studies, observational studies, review studies and grey literature. RESULTS: We identified 8 observational studies including 40,317 patients and 464 rescuers, and 26 case reports including 33 patients. The reported prevalence of CPR-induced consciousness was between 0.23% to 0.9% of resuscitation attempts, with 48-59% of experienced professional rescuers surveyed estimated to have observed CPR-induced consciousness. CPR-induced consciousness is associated with professional rescuer CPR, witnessed arrest, a shockable rhythm, increased return of spontaneous circulation (ROSC), and survival to hospital discharge when compared to patients without CPR-induced consciousness. Few studies of sedation for CPR-induced consciousness were identified. Although local protocols for treating CPR-induced consciousness exist, there is no widely accepted guidance. CONCLUSIONS: CPR-related cognitive activity, consciousness, awareness and recall is uncommon but increasingly reported by professional rescuers. The data available was heterogeneous in nature and not suitable for progression to a systematic review process. Although local treatment protocols exist for management of CPR-induced consciousness, there are no widely accepted treatment guidelines. More studies are required to investigate the management of CPR-induced consciousness.

2. Sci Rep. 2022 May 18;12(1):8293. doi: 10.1038/s41598-022-12310-5.

Influence of circulatory shock at hospital admission on outcome after out-of-hospital cardiac arrest.

Düring J(1), Annborn M(2), Dankiewicz J(3), Dupont A(4), Forsberg S(5)(6), Friberg H(7), Kern KB(8), May TL(9), McPherson J(10), Patel N(11), Seder DB(8), Stammet P(12)(13), Sunde K(14)(15), Søreide E(16)(17), Ullén S(18), Nielsen N(2).

ABSTRACT

Hypotension after cardiac arrest could aggravate prolonged hypoxic ischemic encephalopathy. The association of circulatory shock at hospital admission with outcome after cardiac arrest has not been well studied. The objective of this study was to investigate the independent association of circulatory shock at hospital admission with neurologic outcome, and to evaluate whether cardiovascular comorbidities interact with circulatory shock. 4004 adult patients with out-of-hospital cardiac arrest enrolled in the International Cardiac Arrest Registry 2006-2017 were included in analysis. Circulatory shock was defined as a systolic blood pressure below 90 mmHg and/or medical or mechanical supportive measures to maintain adequate perfusion during hospital admission. Primary outcome was cerebral performance category (CPC) dichotomized as good, (CPC 1-2) versus poor (CPC 3-5) outcome at hospital discharge. 38% of included patients were in circulatory shock at hospital admission, 32% had good neurologic outcome at hospital discharge. The adjusted odds ratio for good neurologic outcome in patients without preexisting cardiovascular disease with circulatory shock at hospital admission was 0.60 [0.46-0.79]. No significant interaction was detected with preexisting comorbidities in the main analysis. We conclude that circulatory shock at hospital admission after out-of-hospital cardiac arrest is independently associated with poor neurologic outcome.

3. Circ J. 2022 May 14. doi: 10.1253/circj.CJ-22-0047. Online ahead of print.

Heart Rate and Mortality After Resuscitation in Patients With Out-of-Hospital Cardiac Arrest - Insights From the SOS-KANTO Registry.

Matsumoto S(1), Nakanishi R(1), Ichibayashi R(2), Honda M(2), Hayashida K(3), Sakurai A(4), Kitamura N(5), Tagami T(6), Nakada TA(7), Takeda M(8), Ikeda T(1); SOS-KANTO Study Group.

ABSTRACT
BACKGROUND: Heart rate (HR) predicts outcomes in patients with acute coronary syndrome (ACS), whereas the impact of HR on outcomes after out-of-hospital cardiac arrest (OHCA) remains unclear. This study aimed to investigate the impact of HR after resuscitation on outcomes after OHCA and whether the impact differs with OHCA etiology.Methods and Results: Of 16,452 patients suffering from OHCA, this study analyzed 741 adults for whom HR after resuscitation was recorded by 12-lead electrocardiogram upon hospital arrival. Etiology of OHCA was categorized into 3 groups: ACS, non-ACS, and non-cardiac. Patients in each etiology group were further divided into tachycardia (>100 beats/min) and non-tachycardia (≤100 beats/min). The impact of HR on outcomes was evaluated in each group. Among the 741 patients, the mean age was 67.6 years and 497 (67.1%) patients were male. The primary outcome - 3-month all-cause mortality - was observed in 55.8% of patients. Tachycardia after resuscitation in patients with ACS was significantly associated with higher all-cause mortality at 3 months (P=0.002), but there was no significant association between tachycardia and mortality in non-ACS and non-cardiac etiology patients. In a multivariate analysis model, the incidence of tachycardia after resuscitation independently predicted higher 3-month all-cause mortality in OHCA patients with ACS (hazard ratio: 2.17 [95% confidence interval: 1.05-4.48], P=0.04). CONCLUSIONS: Increased HR after resuscitation was associated with higher mortality only in patients with ACS.

4. BMC Emerg Med. 2022 May 14;22(1):84. doi: 10.1186/s12873-022-00641-5.
Association between initial body temperature on hospital arrival and neurological outcome among patients with out-of-hospital cardiac arrest: a multicenter cohort study (the CRITICAL study in Osaka, Japan).
Yoshimura S(1), Kiguchi T(2), Irisawa T(3), Yamada T(4), Yoshiya K(5), Park C(6), Nishimura T(7), Ishibe T(8), Yagi Y(9), Kishimoto M(10), Kim SH(11), Hayashi Y(12), Sogabe T(13), Morooka T(14), Sakamoto H(15), Suzuki K(16), Nakamura F(17), Matsuyama T(18), Okada Y(1), Nishioka N(1), Matsui S(19), Kimata S(1), Kawai S(1), Makino Y(1), Kitamura T(19), Iwami T(20); the, CRITICAL Study Group Investigators.
ABSTRACT
BACKGROUND: The association between spontaneous initial body temperature on hospital arrival and neurological outcomes has not been sufficiently studied in patients after out-of-hospital cardiac arrest (OHCA). METHODS: From the prospective database of the Comprehensive Registry of Intensive Care for OHCA Survival (CRITICAL) study in Osaka, Japan, we enrolled all patients with OHCA of medical origin aged > 18 years for whom resuscitation was attempted and who were transported to participating hospitals between 2012 and 2019. We excluded patients who were not witnessed by bystanders and treated by a doctor car or helicopter, which is a car/helicopter with a physician. The patients were categorized into three groups according to their temperature on hospital arrival: ≤35.9 °C, 36.0-36.9 °C (normothermia), and ≥ 37.0 °C. The primary outcome was 1-month survival, with a cerebral performance category of 1 or 2. Multivariable logistic regression analyses were performed to evaluate the association between temperature and outcomes (normothermia was used as the reference). We also assessed this association using cubic spline regression analysis. RESULTS: Of the 18,379 patients in our database, 5014 witnessed adult OHCA patients of medical origin from 16 hospitals were included. When analyzing 3318 patients, OHCA patients with an initial body temperature of ≥37.0 °C upon hospital arrival were associated with decreased favorable neurological outcomes (6.6% [19/286] odds ratio, 0.51; 95% confidence interval, 0.27-0.95) compared to patients with normothermia (16.4% [180/1100]), whereas those with an initial body temperature of ≤35.9 °C were not associated with decreased favorable neurological outcomes (11.1% [214/1932]; odds ratio, 0.78; 95% confidence interval, 0.56-1.07). The

cubic regression splines demonstrated that a higher body temperature on arrival was associated with decreased favorable neurological outcomes, and a lower body temperature was not associated with decreased favorable neurological outcomes. CONCLUSIONS: In adult patients with OHCA of medical origin, a higher body temperature on arrival was associated with decreased favorable neurologic outcomes.

IN-HOSPITAL CARDIAC ARREST

1. Resuscitation. 2022 May 14:S0300-9572(22)00155-1. doi: 10.1016/j.resuscitation.2022.05.006. Online ahead of print.

Acute Respiratory Distress Syndrome after In-Hospital Cardiac Arrest.

Shih JA(1), Robertson HK(2), Issa MS(3), V Grossestreuer A(3), Donnino MW(4), Berg KM(5), Moskowitz A(6).

ABSTRACT

OBJECTIVE: Acute respiratory distress syndrome (ARDS) after out-of-hospital cardiac arrest is common and associated with worse outcomes. In the hospital setting, there are many potential risk factors for post-arrest ARDS, such as aspiration, sepsis, and shock. ARDS after in-hospital cardiac arrest (IHCA) has not been characterized. METHODS: We performed a single-center retrospective study of adult patients admitted to the hospital between 2014-2018 who suffered an IHCA, achieved return of spontaneous circulation (ROSC), and were either already intubated at the time of arrest or within 2 hours of ROSC. Post-IHCA ARDS was defined as meeting the Berlin criteria in the first 3 days following ROSC. Outcomes included alive-and-ventilator free days across 28 days, hospital length-of-stay, hospital mortality, and hospital disposition. RESULTS: Of 203 patients included, 146 (71.9%) developed ARDS. In unadjusted analysis, patients with ARDS had fewer alive-and-ventilator-free days over 28 days with a median of 1 (IQR: 0, 21) day, compared to 18 (IQR: 0, 25) days in patients without ARDS (p = 0.03). However, this association was not significant after multivariate adjustment. There was also a non-significant longer hospital length-of-stay (15 [IQR: 7, 26] vs 10 [IQR: 7, 22] days, p = 0.25; median adjusted increase in ARDS patients: 3 [95% CI: -2-8] days, p = 0.27) and higher hospital mortality (53% vs 44%, p = 0.26; aOR 1.6 [95% CI: 0.8-2.9], p = 0.17) in the ARDS group. CONCLUSION: Among IHCA patients, almost three-quarters developed ARDS within 3 days of ROSC. As in out of hospital cardiac arrest, post-IHCA ARDS is common.

2. Resuscitation. 2022 Jun;175:175-176. doi: 10.1016/j.resuscitation.2022.03.034.

Emergency department cardiac arrest.

Giamello JD(1), Bertone C(2), Lauria G(3).

NO ABSTRACT AVAILABLE

3. J Affect Disord. 2022 May 13;310:452-458. doi: 10.1016/j.jad.2022.05.046. Online ahead of print.

Psychiatric morbidity among survivors of in-hospital cardiopulmonary resuscitation: A nationwide cohort study in South Korea.

Oh TK(1), Park HY(2), Song IA(3).

ABSTRACT

BACKGROUND: We aimed to examine the prevalence and associated factors of newly developed psychiatric morbidity among survivors of in-hospital cardiopulmonary resuscitation (ICPR). Additionally, we investigated whether pre-existing and newly developed psychiatric morbidities affect long-term mortality. METHODS: We extracted data from the National Health Insurance Service database in South Korea. Adult ICPR survivors who underwent ICPR from January 1, 2010, to December 31, 2018, and who were alive for more than 1 year after ICPR were enrolled. Depression, anxiety, substance abuse, and post-traumatic stress disorder (PTSD) were evaluated as psychiatric morbidity. RESULTS: A total of 22,611 survivors of ICPR from 615 hospitals in South Korea were

included in the final analysis. Among them, 7825 (34.6%) had pre-existing psychiatric morbidity before ICPR, while 2524 (11.2%) had newly developed psychiatric morbidity after ICPR. In multivariable Cox regression analysis, compared to the no psychiatric morbidity group, the pre-existing psychiatric morbidity group (adjusted hazard ratio, 1.02; 95% confidence interval, 0.94, 1.11; P = 0.629) and the newly developed psychiatric morbidity group (adjusted hazard ratio, 1.02; 95% confidence interval, 0.90, 1.15; P = 0.798) were not associated with 1-year all-cause mortality among 1-year survivors of ICPR. LIMITATION: Retrospective cohort design. CONCLUSIONS: In South Korea, 11.2% of ICPR survivors had newly developed psychiatric morbidity such as depression, anxiety disorder, substance abuse, and PTSD within 1 year after ICPR. However, both pre-existing and newly developed psychiatric morbidities were not associated with 1-year all-cause mortality among 1-year survivors of ICPR.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

1. Resuscitation. 2022 Jun;175:171-172. doi: 10.1016/j.resuscitation.2022.03.031.
A debate on the relationship between out-of-hospital cardiac arrest attributed to poisoning and good neurological outcome.
Zhou C(1), Ye L(2), Luo C(3), Wang G(4), Xu P(5).
NO ABSTRACT AVAILABLE

2. Resuscitation. 2022 Jun;175:173-174. doi: 10.1016/j.resuscitation.2022.04.010.
Reply to: A debate on the relationship between out-of-hospital cardiac arrest attributed to poisoning and good neurological outcome.
Hüser C(1), Seewald S(2).
NO ABSTRACT AVAILABLE

3. Forensic Sci Med Pathol. 2022 Jun;18(2):156-164. doi: 10.1007/s12024-022-00466-5. Epub 2022 Mar 29.
Sudden cardiac deaths have higher proportion of left stellate ganglionitis.
Tse R(1)(2), Garland J(3), McCarthy S(4), Ondruschka B(5), Bardsley EN(6), Wong CX(7), Stables S(4)(8), Paton JFR(6).
ABSTRACT
One of the hypothesized mechanisms of sudden cardiac death in humans is an arrhythmia precipitated by increased sympathetic outflow to a compromised heart. The stellate ganglia provide the main sympathetic innervation to the heart, where the left stellate ganglion appears to play a role in arrhythmogenesis. Case reports of sudden cardiac death have described left stellate ganglion inflammation but no larger studies have been performed. Thus, we have specifically assessed whether the left stellate ganglion was inflamed in those dying from sudden cardiac death versus other causes of death. Thirty-one left stellate ganglia were resected from cadavers diagnosed with sudden cardiac deaths and compared with 18 ganglia from cadavers diagnosed with non-sudden cardiac deaths. Ganglia were stained with hematoxylin and eosin and lymphocytic aggregates compared. The proportion of left stellate ganglion inflammation (77%) was significantly higher in deaths from sudden cardiac deaths than non-sudden cardiac deaths (33%). This study provides

information on a previously recognized, but understudied, structure that may help understand sudden cardiac death. We found high prevalence of stellate ganglion inflammation and propose that this may trigger sympathetic storms.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

No articles identified.

FEEDBACK

No articles identified.

DRUGS

1. BMC Nurs. 2022 May 16;21(1):116. doi: 10.1186/s12912-022-00895-1.
Nurses' knowledge and understanding of obstacles encountered them when administering resuscitation medications: a cross-sectional study from Palestine.
Qedan RI(1), Daibes MA(1), Al-Jabi SW(1), Koni AA(1)(2), Zyoud SH(3)(4)(5).
ABSTRACT
BACKGROUND: Medication errors (ME) are one of the most important reasons for patient morbidity and mortality, but insufficient drug knowledge among nurses is considered a major factor in drug administration errors. Furthermore, the complex and stressful systems surrounding resuscitation events increase nursing errors. AIMS: This study aimed to assess the knowledge about resuscitation medications and understand the obstacles faced by nurses when giving resuscitation medications. Additionally, errors in the reporting of resuscitation medication administration and the reasons that prevented nurses from reporting errors were investigated. METHODS: A cross-sectional study was conducted in the West Bank, Palestine. Convenient sampling was used to collect data, which was collected via a face-to-face interview questionnaire taken from a previous study. The questionnaire consisted of five parts: demographic data, knowledge of resuscitation medications (20 true/false questions), self-evaluation and causes behind not reporting ME, with suggestions to decrease ME. RESULTS: A total of 200 nurses participated in the study. Nurses were found to have insufficient knowledge about resuscitation medications (58.6%). A high knowledge score was associated with male nurses, those working in the general ward, the cardiac care unit (CCU), the intensive care unit (ICU) and the general ward. The main obstacles nurses faced when administering resuscitation medication were the chaotic environment in cardiopulmonary resuscitation (62%), the unavailability of pharmacists for a whole day (61%), and different medications that look alike in the packaging (61%). Most nurses (70.5%) hoped to gain additional training. In our study, we found no compatibility in the definition of ME between nurses and hospitals (43.5%). CONCLUSIONS: Nurses had insufficient knowledge of resuscitation medications. One of the obstacles nurses faced was that pharmacists should appropriately arrange medications, and nurses wanted continuous learning and additional training about resuscitation medications to decrease ME.

TRAUMA

1. Am Surg. 2022 May 15:31348221101479. doi: 10.1177/00031348221101479. Online ahead of print.

Atrial Cannulation During Resuscitative Clamshell Thoracotomy.

Willis G(1), Robinson JN(1), Green JM(1), Dieffenbaugher ST(1), Madjarov JM(2), LeNoir BJ(2), Frederick JR(2), Sing RF(1), Cunningham KW(1).

ABSTRACT

BACKGROUND: Resuscitative thoracotomy and clamshell thoracotomy are performed in the setting of traumatic arrest with the intent of controlling hemorrhage, relieving tamponade, and providing open chest cardiopulmonary resuscitation. Historically, return of spontaneous circulation rates for penetrating traumatic arrest as well as out of hospital survival have been reported as low as 40% and 10%. Vascular access can be challenging in patients who have undergone a traumatic arrest and can be a limiting step to effective resuscitation. Atrial cannulation is a well-established surgical technique in cardiac surgery. Herein, we present a case series detailing our application of this technique in the context of acute trauma resuscitation during clamshell thoracotomy for traumatic arrest in the emergency department. METHODS: A retrospective case series of atrial cannulation during traumatic arrest was conducted in Charlotte, NC at Carolinas Medical Center an urban level 1 trauma center. RESULTS: The mean rate of return of spontaneous circulation in our series, 60%, was greater than previously published upper limit of return of spontaneous circulation for penetrating causes of traumatic arrest. DISCUSSION: Intravenous access can be difficult to establish in the hypovolemic and exsanguinating patient. Traditional methods of vascular access may be insufficient in the setting of central vascular injury. Atrial appendage cannulation during atrial cannulation is a quick and reliable technique to achieve vascular access that employs common methods from cardiac surgery to improve resuscitation of traumatic arrest.

VENTILATION

1. Resuscitation. 2022 May 18:S0300-9572(22)00158-7. doi: 10.1016/j.resuscitation.2022.05.008. Online ahead of print.

Airway Strategy and Ventilation Rates in the Pragmatic Airway Resuscitation Trial.

Wang H(1), Jaureguibeitia X(2), Aramendi E(3), Nichol G(4), Aufderheide T(5), Daya MR(6), Hansen M(7), Nassal M(8), Panchal A(9), Nikollah DA(10), Alonso E(11), Carlson J(12), Schmicker RH(13), Stephens S(14), Irusta U(15), Idris A(16).

ABSTRACT

BACKGROUND: We sought to describe ventilation rates during out-of-hospital cardiac arrest (OHCA) resuscitation and their associations with airway management strategy and outcomes. METHODS: We analyzed continuous end-tidal carbon dioxide capnography data from adult OHCA enrolled in the Pragmatic Airway Resuscitation Trial (PART). Using automated signal processing techniques, we determined continuous ventilation rate for consecutive 10-second epochs after airway insertion. We defined hypoventilation as a ventilation rate <6 breaths/min. We defined hyperventilation as a ventilation rate >12 breaths/min. We compared differences in total and percentage post-airway hyper- and hypoventilation between airway interventions (laryngeal tube (LT) vs. endotracheal intubation (ETI). We also determined associations between hypo-/hyperventilation and OHCA outcomes (ROSC, 72-hour survival, hospital survival, hospital survival with favorable neurologic status). RESULTS: Adequate post-airway capnography were available for 1,010 (LT n=714, ETI n=296) of 3,004 patients. Median ventilation rates were: LT 8.0 (IQR 6.5-9.6) breaths/min, ETI 7.9 (6.5-9.7) breaths/min. Total duration and percentage of post-airway time with hypoventilation were similar between LT and ETI: median 1.8 vs. 1.7 minutes, p=0.94; median 10.5% vs. 11.5%, p=0.60. Total

duration and percentage of post-airway time with hyperventilation were similar between LT and ETI: median 0.4 vs. 0.4 minutes, p=0.91; median 2.1% vs. 1.9%, p=0.99. Hypo- and hyperventilation exhibited limited associations with OHCA outcomes. CONCLUSION: In the PART Trial, EMS personnel delivered post-airway ventilations at rates satisfying international guidelines, with only limited hypo- or hyperventilation. Hypo- and hyperventilation durations did not differ between airway management strategy and exhibited uncertain associations with OCHA outcomes.

2. Am J Respir Crit Care Med. 2022 May 17. doi: 10.1164/rccm.202111-2644LE. Online ahead of print.
Gas Exchange and Respiratory Mechanics After a Cardiac Arrest: A Clinical Description of Cardiopulmonary Resuscitation-Associated Lung Edema.
Beloncle FM(1), Merdji H(2), Lesimple A(3), Pavlovsky B(4), Yvin E(5), Savary D(6), Mercat A(7), Meziani F(8), Richard JC(9).
NO ABSTRACT AVAILABLE

CERERBRAL MONITORING

1. Neurocrit Care. 2022 Jun;36(3):974-982. doi: 10.1007/s12028-021-01405-y. Epub 2021 Dec 6.
Machine Learning for Early Detection of Hypoxic-Ischemic Brain Injury After Cardiac Arrest.
Mansour A(#)(1)(2), Fuhrman JD(#)(3), Ammar FE(1), Loggini A(1), Davis J(1), Lazaridis C(1)(2), Kramer C(1)(2), Goldenberg FD(4)(5), Giger ML(6).
ABSTRACT
BACKGROUND: Establishing whether a patient who survived a cardiac arrest has suffered hypoxic-ischemic brain injury (HIBI) shortly after return of spontaneous circulation (ROSC) can be of paramount importance for informing families and identifying patients who may benefit the most from neuroprotective therapies. We hypothesize that using deep transfer learning on normal-appearing findings on head computed tomography (HCT) scans performed after ROSC would allow us to identify early evidence of HIBI. METHODS: We analyzed 54 adult comatose survivors of cardiac arrest for whom both an initial HCT scan, done early after ROSC, and a follow-up HCT scan were available. The initial HCT scan of each included patient was read as normal by a board-certified neuroradiologist. Deep transfer learning was used to evaluate the initial HCT scan and predict progression of HIBI on the follow-up HCT scan. A naive set of 16 additional patients were used for external validation of the model. RESULTS: The median age (interquartile range) of our cohort was 61 (16) years, and 25 (46%) patients were female. Although findings of all initial HCT scans appeared normal, follow-up HCT scans showed signs of HIBI in 29 (54%) patients (computed tomography progression). Evaluating the first HCT scan with deep transfer learning accurately predicted progression to HIBI. The deep learning score was the most significant predictor of progression (area under the receiver operating characteristic curve = 0.96 [95% confidence interval 0.91-1.00]), with a deep learning score of 0.494 having a sensitivity of 1.00, specificity of 0.88, accuracy of 0.94, and positive predictive value of 0.91. An additional assessment of an independent test set confirmed high performance (area under the receiver operating characteristic curve = 0.90 [95% confidence interval 0.74-1.00]). CONCLUSIONS: Deep transfer learning used to evaluate normal-appearing findings on HCT scans obtained early after ROSC in comatose survivors of cardiac arrest accurately identifies patients who progress to show radiographic evidence of HIBI on follow-up HCT scans.

2. Am J Emerg Med. 2022 Jun;56:280-281. doi: 10.1016/j.ajem.2021.07.019. Epub 2021 Jul 21.
Prehospital, post-ROSC blood pressure and associated neurologic outcome: Do not dismiss other outcome cofounders.
Jouffroy R(1), Vivien B(2).

NO ABSTRACT AVAILABLE

3. Rev Esp Cardiol (Engl Ed). 2022 May 12:S1885-5857(22)00069-X. doi: 10.1016/j.rec.2022.03.004. Online ahead of print.
Bispectral index and suppression ratio after cardiac arrest: are they useful as bedside tools for rational treatment escalation plans? [Article in English, Spanish]
Arbas-Redondo E(1), Rosillo-Rodríguez SO(2), Merino-Argos C(3), Marco-Clement I(3), Rodríguez-Sotelo L(3), Martínez-Marín LA(3), Martín-Polo L(3), Vélez-Salas A(3), Caro-Codón J(2), García-Arribas D(4), Armada-Romero E(2), López-De-Sa E(2).
ABSTRACT
INTRODUCTION AND OBJECTIVES: Myocardial dysfunction contributes to early mortality (24-72 hours) among survivors of a cardiac arrest (CA). The benefits of mechanical support in refractory shock should be balanced against the patient's potential for neurological recovery. To date, these early treatment decisions have been taken based on limited information leading mainly to undertreatment. Therefore, there is a need for early, reliable, accessible, and simple tools that offer information on the possibilities of neurological improvement. METHODS: We collected data from bispectral index (BIS) and suppression ratio (SR) monitoring of adult comatose survivors of CA managed with targeted temperature management (TTM). Neurological status was assessed according to the Cerebral Performance Category (CPC) scale. RESULTS: We included 340 patients. At the first full neurological evaluation, 211 patients (62.1%) achieved good outcome or CPC 1-2. Mean BIS values were significantly higher and median SR lower in patients with CPC 1-2. An average BIS> 26 during first 12 hours of TTM predicted good outcome with 89.5% sensitivity and 75.8% specificity (AUC of 0.869), while average SR values> 24 during the first 12 hours of TTM predicted poor outcome (CPC 3-5) with 91.5% sensitivity and 81.8% specificity (AUC, 0.906). Hourly BIS and SR values exhibited good predictive performance (AUC> 0.85), as soon as hour 2 for SR and hour 4 for BIS. CONCLUSIONS: BIS/SR are associated with patients' potential for neurological recovery after CA. This finding could help to create awareness of the possibility of a better outcome in patients who might otherwise be wrongly considered as nonviable and to establish personalized treatment escalation plans.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. N Engl J Med. 2022 May 19;386(20):1953-1954. doi: 10.1056/NEJMc2200833.
Use of a Drone-Delivered Automated External Defibrillator in an Out-of-Hospital Cardiac Arrest.
Schierbeck S(1), Svensson L(1), Claesson A(1).
NO ABSTRACT AVAILABLE

2. J Med Internet Res. 2022 May 18;24(5):e38508. doi: 10.2196/38508.
A Short Intervention and an Interactive e-Learning Module to Motivate Medical and Dental Students to Enlist as First Responders: Implementation Study.
Taramarcaz V(#)(1), Herren T(#)(1), Golay E(1), Regard S(1), Martin-Achard S(2), Mach F(3), Schnetzler N(1), Ricci G(1), Zamberg I(4), Larribau R(1), Niquille M(1), Suppan M(4), Schiffer E(4), Suppan L(1).

ABSTRACT
BACKGROUND: Prompt and proficient basic life support (BLS) maneuvers are essential to increasing the odds of survival after out-of-hospital cardiac arrest. However, significant time can elapse before the arrival of professional rescuers. To decrease these delays, many countries have developed first responder networks. These networks are composed of BLS-certified lay or professional rescuers who can be dispatched by emergency medical communication centers to take care of those who experience out-of-hospital cardiac arrest. Many systems are, however, limited by a relatively low number of active first responders, and first-year medical and dental students may represent an almost untapped pool of potential rescuers. On top of providing an enhanced BLS coverage to the population, this could also help medical students be better prepared to their future role as certified health care providers and address societal expectations regarding health care students. OBJECTIVE: Our objective was to describe the impact of a short motivational intervention followed by a blended BLS course (e-learning and practice session) designed to motivate first-year medical and dental students to enlist as first responders. METHODS: A short, web-based, motivational intervention presenting this project took place, and first-year University of Geneva, Faculty of Medicine students were provided with a link to the study platform. Those who agreed to participate were redirected to a demographic questionnaire before registering on the platform. The participants were then asked to answer a second questionnaire designed to determine their baseline knowledge prior to following an interactive e-learning module. Upon completion, a web-based booking form enabling them to register for a 1-hour practice session was displayed. These sessions were held by senior medical students who had been trained and certified as BLS instructors. The participants who attended these practice sessions were asked to answer a postcourse questionnaire before receiving the certificate enabling them to register as first responders. RESULTS: Out of the 529 first-year students registered at University of Geneva, Faculty of Medicine on January 14, 2021, 190 (35.9%) initially agreed to participate. Moreover, 102 (19.3%) attended the practice sessions, and 48 (9.1%) had completed all training and enlisted as first responders on the dedicated platform, Save a Life, at 6 months (July 14, 2021). Postcourse confidence in resuscitation skills was associated with a higher likelihood of registering as first responder (P=.03). No association was found between prior BLS knowledge and the probability of registering to a practice session (P=.59), of obtaining a course completion certificate (P=.29), or of enlisting as first responder (P=.56). CONCLUSIONS: This study shows that a motivational intervention associated with a short BLS course can convince medical students to enlist as first responders. Further studies are needed to understand the rather low proportion of medical students finally registering as first responders.

3. BMC Palliat Care. 2022 May 18;21(1):79. doi: 10.1186/s12904-022-00975-8.
Eleven-year retrospective study characterizing patients with severe brain damage and poor neurological prognosis -role of physicians' attitude toward life-sustaining treatment.
Wakatake H(1), Hayashi K(2), Kitano Y(2), Hsu HC(3), Yoshida T(4), Masui Y(2), Taira Y(2), Fujitani S(4).
ABSTRACT
BACKGROUND: Severe brain hemorrhage/infarction and cardiac arrest constitute the most critical situations leading to poor neurological prognosis. Characterization of these patients is required to offer successful end-of-life care, but actual practice is affected by multiple confounding factors, including ethicolegal issues, particular in Japan and Asia. The aim of this study is to evaluate the clinical courses of patients with severe brain damage and to assess the preference of end-of-life care for these patients in Japanese hospitals. METHODS: A retrospective observational study was conducted between 2008 and 2018. All intracranial hemorrhage/infarction and cardiac arrest out-patients (n = 510) who were admitted to our two affiliated hospitals and survived but with poor

neurologic outcomes were included. Demographic characteristics as well as prognosis and treatment policies were also assessed. RESULTS: Patients were divided into two categories; cases with absent brainstem reflex (BSR) (BSR[-]) and those with preserved BSR (BSR[+]). The survival rate was higher and the length of hospitalization was longer in patients with BSR[+] than in those with BSR[-]. Among three life-sustaining policies (i.e., aggressive treatment, withdrawal of treatment, and withholding of treatment), withholding of treatment was adopted to most patients. In BSR[-], the proportion of three treatment policies performed at the final decision did not differ from that at the initial diagnosis on neurological status (p = 0.432). In contrast, this proportion tended to be altered in BSR[+] (p = 0.072), with a decreasing tendency of aggressive treatment and a modest increasing tendency of withdrawal of treatment. Furthermore, the requests from patients' families to withdraw life-sustaining treatment, including discontinuation of mechanical ventilation, increased, but actual implementation of withdrawal by physicians was less than half of the requests. CONCLUSIONS: BSR constitutes a crucial determinant of mortality and length of hospitalization in comatose patients with severe brain damage. Although the number of withdrawal of life-sustaining treatment tends to increase over time in BSR[+] patients, there are many more requests from patients' families for withdrawal. Since physicians has a tendency to desist from withdrawing life-sustaining treatment, more in-depth communication between medical staff and patients' families will facilitate mutual understanding over ethicolegal and religious issues and may thus improve end-of-life care.

4. Crit Care. 2022 May 16;26(1):137. doi: 10.1186/s13054-022-03999-x.

Termination-of-resuscitation rule in the emergency department for patients with refractory out-of-hospital cardiac arrest: a nationwide, population-based observational study.

Goto Y(1), Funada A(2), Maeda T(3), Goto Y(4).

ABSTRACT

BACKGROUND: In Japan, emergency medical service (EMS) providers are prohibited from field termination-of-resuscitation (TOR) in out-of-hospital cardiac arrest (OHCA) patients. In 2013, we developed a TOR rule for emergency department physicians (Goto's TOR rule) immediately after hospital arrival. However, this rule is subject to flaws, and there is a need for revision owing to its relatively low specificity for predicting mortality compared with other TOR rules in the emergency department. Therefore, this study aimed to develop and validate a modified Goto's TOR rule by considering prehospital EMS cardiopulmonary resuscitation (CPR) duration. METHODS: We analysed the records of 465,657 adult patients with OHCA from the All-Japan Utstein registry from 2016 to 2019 and divided them into two groups: development (n = 231,363) and validation (n = 234,294). The primary outcome measures were specificity, false-positive rate (FPR), and positive predictive value (PPV) of the revised TOR rule in the emergency department for predicting 1-month mortality. RESULTS: Recursive partitioning analysis for the development group in predicting 1-month mortality revealed that a modified Goto's TOR rule could be defined if patients with OHCA met the following four criteria: (1) initial asystole, (2) unwitnessed arrest by any laypersons, (3) EMS-CPR duration > 20 min, and (4) no prehospital return of spontaneous circulation (ROSC). The specificity, FPR, and PPV of the rule for predicting 1-month mortality were 99.2% (95% confidence interval [CI], 99.0-99.4%), 0.8% (0.6-1.0%), and 99.8% (99.8-99.9%), respectively. The proportion of patients who fulfilled the rule and the area under the receiver operating curve (AUC) was 27.5% (95% CI 27.3-27.7%) and 0.904 (0.902-0.905), respectively. In the validation group, the specificity, FPR, PPV, proportion of patients who met the rule, and AUC were 99.1% (95% CI 98.9-99.2%), 0.9% (0.8-1.1%), 99.8% (99.8-99.8%), 27.8% (27.6-28.0%), and 0.889 (0.887-0.891), respectively. CONCLUSION: The modified Goto's TOR rule (which includes the following four criteria: initial asystole, unwitnessed arrest, EMS-CPR duration > 20 min, and no prehospital ROSC) with a > 99% predictor of 1-month mortality is a reliable tool for physicians treating refractory OHCAs immediately after hospital arrival.

5. J Cardiothorac Surg. 2022 May 16;17(1):119. doi: 10.1186/s13019-022-01863-1.
Public knowledge and attitudes toward automated external defibrillators use among first aid eLearning course participants: a survey.
Wang YM(#)(1)(2), Lin LT(#)(1)(2), Jiang JH(#)(1), Jiang Y(3), Jin XQ(4).
ABSTRACT
OBJECTIVE: Survival from out-of-hospital cardiac arrest (OHCA) often depends on the effective and immediate use of automated external defibrillators (AEDs). Given that there have been few studies about AED use in China, the purpose of this study is to investigate the knowledge and attitudes regarding AED use among the Chinese public, then provide an effective suggestion for AED education strategies and legislation. METHOD: The online survey was conducted among Chinese participants of the First Aid eLearning courses in June 2020. RESULT: A total of 2565 (95.00%) surveys were completed, only 23.46% of respondents with non-medical related respondents reported having attended previous AED training courses. Regarding the basic knowledge of AEDs, few respondents (12.28%, n = 315) could answer all four questions correctly. 95.67% (n = 2454) were willing to learn AED use. Even if without the precondition of being skilled in AEDs, the female was more likely to rescue OHCA patients than the male (p = 0.003). Almost all respondents (96.65%) showed a strong willingness to rescue OHCA patients with training in using AEDs. The top four barriers to rescuing OHCA patients were lack of practical performing ability (60.47%), fear of hurting patients (59.30%), inadequate knowledge of resuscitation techniques (44.19%), and worry about taking legal responsibility (26.74%). CONCLUSION: Our study reflects a deficiency of AED knowledge among the general public in China. However, positive attitudes towards rescuing OHCA patients and learning AED use were observed, which indicates that measures need to be taken to disseminate knowledge and use of AEDs.

6. Am J Emerg Med. 2022 Jun;56:196-204. doi: 10.1016/j.ajem.2022.03.053. Epub 2022 Apr 7.
Cardiopulmonary resuscitation training: A narrative review comparing traditional educational programs with alternative, reduced-resource methods of CPR instruction for lay providers.
Edinboro D(1), Brady W(2).
ABSTRACT
This narrative review explores current literature base detailing the effectiveness of alternative CPR instruction as compared to traditional CPR courses in the lay population. Assessment of alternative instructional methods found that video self-instruction and simplified CPR formats resulted in equivalent performance of CPR metrics and practical scenario assessment performance, as compared to traditional CPR instruction courses. While additional research is needed to further substantiate the value of self-directed learning, interactive digital, and abbreviated formats, these studies also suggested equivalence in CPR performance compared to traditional courses. In view of the importance of bystander CPR in OHCA outcomes, and the barriers presented by traditional CPR education courses, we recommend that public safety leaders and CPR educators strongly consider the introduction of these programs within their communities and classrooms.

7. Ann N Y Acad Sci. 2022 May;1511(1):5-21. doi: 10.1111/nyas.14740. Epub 2022 Feb 18.
Guidelines and standards for the study of death and recalled experiences of death--a multidisciplinary consensus statement and proposed future directions.
Parnia S(1), Post SG(2), Lee MT(3), Lyubomirsky S(4), Aufderheide TP(5), Deakin CD(6), Greyson B(7), Long J(8), Gonzales AM(1), Huppert EL(1), Dickinson A(1), Mayer S(9), Locicero B(2), Levin J(10), Bossis A(11), Worthington E(12), Fenwick P(13), Shirazi TK(1).
ABSTRACT

An inadvertent consequence of advances in stem cell research, neuroscience, and resuscitation science has been to enable scientific insights regarding what happens to the human brain in relation to death. The scientific exploration of death is in large part possible due to the recognition that brain cells are more resilient to the effects of anoxia than assumed. Hence, brain cells become irreversibly damaged and "die" over hours to days postmortem. Resuscitation science has enabled life to be restored to millions of people after their hearts had stopped. These survivors have described a unique set of recollections in relation to death that appear universal. We review the literature, with a focus on death, the recalled experiences in relation to cardiac arrest, post-intensive care syndrome, and related phenomena that provide insights into potential mechanisms, ethical implications, and methodologic considerations for systematic investigation. We also identify issues and controversies related to the study of consciousness and the recalled experience of cardiac arrest and death in subjects who have been in a coma, with a view to standardize and facilitate future research.

8. Adv Simul (Lond). 2022 May 21;7(1):15. doi: 10.1186/s41077-022-00209-0.
Hospital-wide cardiac arrest in situ simulation to identify and mitigate latent safety threats.
Bentley SK(1)(2)(3), Meshel A(4), Boehm L(5)(6), Dilos B(7), McIndoe M(8), Carroll-Bennett R(9)(10), Astua AJ(11), Wong L(12)(13), Smith C(12)(13), Iavicoli L(12)(13), LaMonica J(13), Lopez T(14), Quitain J(14), Dube G(6), Manini AF(13)(15), Halbach J(6), Meguerdichian M(16)(17), Bajaj K(18)(19).
ABSTRACT
BACKGROUND: Cardiac arrest resuscitation requires well-executed teamwork to produce optimal outcomes. Frequency of cardiac arrest events differs by hospital location, which presents unique challenges in care due to variations in responding team composition and comfort levels and familiarity with obtaining and utilizing arrest equipment. The objective of this initiative is to utilize unannounced, in situ, cardiac arrest simulations hospital wide to educate, evaluate, and maximize cardiac arrest teams outside the traditional simulation lab by systematically assessing and capturing areas of opportunity for improvement, latent safety threats (LSTs), and key challenges by hospital location. METHODS: Unannounced in situ simulations were performed at a city hospital with multidisciplinary cardiac arrest teams responding to a presumed real cardiac arrest. Participants and facilitators identified LSTs during standardized postsimulation debriefings that were classified into equipment, medication, resource/system, or technical skill categories. A hazard matrix was used by multiplying occurrence frequency of LST in simulation and real clinical events (based on expert opinion) and severity of the LST based on agreement between two evaluators. RESULTS: Seventy-four in situ cardiac arrest simulations were conducted hospital wide. Hundreds of safety threats were identified, analyzed, and categorized yielding 106 unique latent safety threats: 21 in the equipment category, 8 in the medication category, 41 in the resource/system category, and 36 in the technical skill category. The team worked to mitigate all LSTs with priority mitigation to imminent risk level threats, then high risk threats, followed by non-imminent risk LSTs. Four LSTs were deemed imminent, requiring immediate remediation post debriefing. Fifteen LSTs had a hazard ratio greater than 8 which were deemed high risk for remediation. Depending on the category of threat, a combination of mitigating steps including the immediate fixing of an identified problem, leadership escalation, and programmatic intervention recommendations occurred resulting in mitigation of all identified threats. CONCLUSIONS: Hospital-wide in situ cardiac arrest team simulation offers an effective way to both identify and mitigate LSTs. Safety during cardiac arrest care is improved through the use of a system in which LSTs are escalated urgently, mitigated, and conveyed back to participants to provide closed loop debriefing. Lastly, this hospital-wide, multidisciplinary initiative additionally served as an educational needs assessment allowing for informed, iterative education and systems improvement initiatives targeted to areas of LSTs and areas of opportunity.

9. Br J Sports Med. 2022 May 19:bjsports-2021-104964. doi: 10.1136/bjsports-2021-104964. Online ahead of print.

Prehospital interventions and neurological outcomes in marathon-related sudden cardiac arrest using a rapid mobile automated external defibrillator system in Japan: a prospective observational study.

Tanaka H(#)(1)(2)(3), Kinoshi T(1)(2)(3), Tanaka S(#)(4)(5), Sagisaka R(2)(6), Takahashi H(1)(2)(3), Sone E(2), Hara T(3), Takeda Y(7), Takyu H(1)(3).

ABSTRACT

OBJECTIVE: To describe neurological outcomes after sudden cardiac arrests (SCAs) in road and long-distance races using a rapid mobile automated external defibrillator system (RMAEDS) intervention. METHODS: A total of 42 SCAs from 3 214 701 runners in 334 road and long-distance races from 1 February 2007 to 29 February 2020 were examined. Demographics, SCA interventions, EMS-related data and SCA-related outcomes were measured. Primary endpoints were favourable neurological outcomes (Cerebral Performance Categories 1-2) at 1-month and 1-year post-SCA. Secondary endpoints were factors related to the field return of spontaneous circulation (ROSC) and resuscitation characteristics, including the initial ECG waveform classification and resuscitation sequence times according to the initial ECG rhythm. RESULTS: The SCA incidence rate was 1.31 per 100 000 runners (age: median (IQR), 51 (36.5, 58.3) years). Field ROSC and full neurological recovery at 1-month post-SCA was achieved 90.4% and 92.9% of cases, respectively. In 22 cases in which bystander cardiopulmonary resuscitation was initiated within 1 min and defibrillation performed within 3 min, full neurological recovery was achieved at 1-month and 1-year post-SCA in 95.5.% and 95.5% of cases, respectively. CONCLUSIONS: The RMAEDS successfully treated patients with SCA during road and long-distance races yielding a high survival rate and favourable neurological outcomes. These findings support rapid intervention and the proper placement of healthcare teams along the race course to initiate chest compressions within 1 min and perform defibrillation within 3 min.

10. JAMA Netw Open. 2022 May 2;5(5):e2212964. doi: 10.1001/jamanetworkopen.2022.12964.

Long-term Effect of Face-to-Face vs Virtual Reality Cardiopulmonary Resuscitation (CPR) Training on Willingness to Perform CPR, Retention of Knowledge, and Dissemination of CPR Awareness: A Secondary Analysis of a Randomized Clinical Trial.

Nas J(1), Thannhauser J(1), Konijnenberg LSF(1), van Geuns RM(1), van Royen N(1), Bonnes JL(1), Brouwer MA(1).

ABSTRACT

IMPORTANCE: Increased bystander cardiopulmonary resuscitation (CPR) is essential to improve survival after cardiac arrest. Although most studies focus on technical CPR skills, the randomized Lowlands Saves Lives trial prespecified a follow-up survey on other important aspects that affect the widespread performance of CPR. OBJECTIVE: To investigate bystander willingness to perform CPR on a stranger, theoretical knowledge retention, and dissemination of CPR awareness 6 months after undergoing short face-to-face and virtual reality (VR) CPR trainings. DESIGN, SETTING, AND PARTICIPANTS: A prespecified 6-month posttraining survey was conducted among 320 participants in the Lowlands Saves Lives trial, a randomized comparison between 20-minute face-to-face, instructor-led CPR training and VR training. Participants were recruited at the Lowlands music festival, with a designated area to conduct scientific projects (August 16-18, 2019; the Netherlands). Statistical analysis was performed from March 1, 2020, to July 31, 2021. INTERVENTIONS: Two standardized 20-minute protocols on CPR and automated external defibrillator use: instructor-led face-to-face training using CPR manikins or VR training using the Resuscitation Council (UK)-

endorsed Lifesaver VR smartphone application and a pillow to practice compressions. MAIN OUTCOMES AND MEASURES: Primary outcomes were willingness to perform CPR on a stranger, theoretical knowledge retention, and dissemination of CPR awareness as reported by the entire cohort. As secondary analyses, the results of the 2 training modalities were compared. RESULTS: Of 381 participants, 320 consented to this follow-up survey; 188 participants (115 women [61%]; median age, 26 years [IQR, 22-32 years]) completed the entire survey and were accordingly included in the secondary analysis. The overall proportion of participants willing to perform CPR on a stranger was 77% (144 of 188): 81% (79 of 97) among face-to-face participants and 71% (65 of 91) among VR participants (P = .02); 103 participants (55%) reported feeling scared to perform CPR (P = .91). Regarding theoretical knowledge retention, a median of 7 (IQR, 6-8) of 9 questions were answered correctly in both groups (P = .81). Regarding dissemination of CPR awareness, 65% of participants (123 of 188) told at least 1 to 10 family members or friends about the importance of CPR, and 15% (29 of 188) had participated in certified, instructor-led training at the time of the survey, without differences between groups. CONCLUSIONS AND RELEVANCE: In this 6-month posttraining survey, young adult participants of short CPR training modules reported high willingness (77%) to perform CPR on a stranger, with slightly higher rates for face-to-face than for VR participants. Theoretical knowledge retention was good, and the high dissemination of awareness suggests that these novel CPR training modules staged at a public event are promising sensitizers for involvement in CPR, although further challenges include mitigating the fear of performing CPR.

11. Am J Emerg Med. 2022 Jun;56:380-381. doi: 10.1016/j.ajem.2021.11.012. Epub 2021 Nov 12.
Impact of multi-tier response and prolonged on-scene resuscitation on out-of-hospital cardiac arrest.
Taylor D(1), Berezowski I(2), Abdelmonem A(3), Chowdhury S(3), Prajapati D(4), Patel J(3).
NO ABSTRACT AVAILABLE

POST-CARDIAC ARREST TREATMENTS

1. JACC Cardiovasc Interv. 2022 May 23;15(10):1085-1086. doi: 10.1016/j.jcin.2022.04.009.
Immediate Coronary Angiogram in Out-of-Hospital Cardiac Arrest: Looking for a Miracle.
Spaulding C(1), Sideris G(2).
NO ABSTRACT AVAILABLE

2. JACC Cardiovasc Interv. 2022 May 23;15(10):1074-1084. doi: 10.1016/j.jcin.2022.03.035.
MIRACLE(2) Score and SCAI Grade to Identify Patients With Out-of-Hospital Cardiac Arrest for Immediate Coronary Angiography.
Pareek N(1), Beckley-Hoelscher N(2), Kanyal R(3), Cannata A(3), Kordis P(4), Sunderland N(5), Kirresh A(6), Nevett J(7), Fothergill R(7), Webb I(3), Dworakowski R(3), Melikian N(3), Kalra S(4), Johnson TW(5), Sinagra G(8), Rakar S(8), Noc M(4), Shah AM(3), Byrne J(3), MacCarthy P(3).
ABSTRACT
OBJECTIVES: The purpose of this study was to evaluate the impact of performing immediate coronary angiography (CAG) after out-of-hospital cardiac arrest (OHCA) with stratification of predicted neurologic injury and cardiogenic shock on arrival to a center. BACKGROUND: The role of immediate CAG for patients with OHCA is unclear, which may in part be explained by the majority of patients dying of hypoxic brain injury. METHODS: Between May 2012 and July 2020, patients from 5 European centers were included in the EUCAR (European Cardiac Arrest Registry). Patients were retrospectively classified into low vs high neurologic risk (MIRACLE2 score 0-3 vs ≥4) and degree of cardiogenic shock on arrival (Society for Cardiovascular Angiography and Interventions [SCAI] grade A vs B-E). A multivariable logistic regression analysis including immediate CAG was performed for the

primary outcome of survival with good neurologic outcome (Cerebral Performance Category 1 or 2) at hospital discharge. RESULTS: Nine hundred twenty-six patients were included in the registry, with 405 (43.7%) in the low-risk group and 521 (56.3%) in the high-risk group. Immediate CAG was independently associated with improved survival with good neurologic outcome in the low MIRACLE2 risk group with ST-segment elevation myocardial infarction (OR: 11.80; 95% CI: 2.24-76.74; P = 0.048) and with SCAI grade B to E shock (OR: 3.23; 95% CI: 1.10-9.50; P = 0.031). No subgroups, including those with ST-segment elevation myocardial infarction and with SCAI grade B to E shock, achieved any benefit from early CAG in the high MIRACLE2 group. CONCLUSIONS: Combined classification of patients with OHCA with 12-lead electrocardiography, MIRACLE2 score 0 to 3, and SCAI grade B to E identifies a potential cohort of patients at low risk for neurologic injury who benefit most from immediate CAG.

TARGETED TEMPERATURE MANAGEMENT

1. Eur Heart J Acute Cardiovasc Care. 2022 May 17:zuac054. doi: 10.1093/ehjacc/zuac054. Online ahead of print.

Targeted temperature management after out of hospital cardiac arrest: quo vadis?

Krychtiuk KA(1), Fordyce CB(2)(3), Hansen CM(4)(5), Hassager C(5), Jentzer JC(6), Menon V(7), Perman SM(8), van Diepen S(9)(10)(11), Granger CB(1).

ABSTRACT

Targeted temperature management (TTM) has become a cornerstone in the treatment of comatose post-cardiac arrest patients over the last two decades. Belief in the efficacy of this intervention for improving neurologically intact survival was based on two trials from 2002, one truly randomized-controlled and one small quasi-randomized trial, without clear confirmation of that finding. Subsequent large randomized trials reported no difference in outcomes between TTM at 33 vs. 36°C and no benefit of TTM at 33°C as compared with fever control alone. Given that these results may help shape post-cardiac arrest patient care, we sought to review the history and rationale as well as trial evidence for TTM, critically review the TTM2 trial, and highlight gaps in knowledge and research needs for the future. Finally, we provide contemporary guidance for the use of TTM in daily clinical practice.

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. Resuscitation. 2022 May 18:S0300-9572(22)00161-7. doi: 10.1016/j.resuscitation.2022.05.011. Online ahead of print.

Circumstances, outcome and quality of cardiopulmonary resuscitation by lifeboat crews; why not always use an AED?

Seesink J(1), Nieuwenburg SAV(2), van der Linden T(3), Bierens JJLM(4).

NO ABSTRACT AVAILABLE

2. J Electrocardiol. 2022 May 11;73:29-33. doi: 10.1016/j.jelectrocard.2022.05.001. Online ahead of print.

Quantification of electrocardiogram instability prior to cardiac arrest in patients with single-ventricle physiology.

Savorgnan F(1), Crouthamel DI(2), Heroy A(2), Santerre J(2), Acosta S(3).

ABSTRACT

OBJECTIVE: To quantify the instability measured in the electrocardiogram (ECG) waveform in patients with single-ventricle physiology before a cardiac arrest and compare with similar patients

who did not have a cardiac arrest. METHODS: We measure the instability in the ECG morphology using variance, entropy, and decorrelation of polynomial fit coefficients of the beat-to-beat segmented data. These three metrics quantify the spread of the ECG morphology, the lack of beat-to-beat periodicity and the lack of predictability, respectively. For each subject, 3 h of ECG data were analyzed. In the arrest group, the end of the third hour coincides with the cardiac arrest. In the control group, the 3-h windows were randomly selected. RESULTS: The study dataset consists of 38 cardiac arrest events and 67 control events. In the hour prior to the cardiac arrest, the variance, entropy, and decorrelation of the polynomial fit coefficients were higher in the arrest group than in the control group ($p = 0.003$, $p = 0.009$, and $p = 0.035$, respectively). For the second and third hours prior to the arrests, the differences in variance, entropy, and decorrelation between the arrest and control groups lost statistical significance. Using these metrics of instability as predictive features in a support vector machine algorithm, we found an area under the receiver operating characteristic curve of 0.8 to distinguish the arrest event from the control events. CONCLUSION: By taking a holistic assessment of the ECG waveform in patients with single-ventricle physiology to measure the instability in its beat-to-beat morphology, the ECG waveform variance, entropy, and decorrelation are found to be statistically different in the patients who arrested compared with patients in the control group.

PEDIATRICS AND CHILDREN

1. Front Pediatr. 2022 Apr 28;10:811819. doi: 10.3389/fped.2022.811819. eCollection 2022.
Epidemiology of Cardiopulmonary Arrest and Outcome of Resuscitation in PICU Across China: A Prospective Multicenter Cohort Study.
Ding X(1), Liu G(1), Qian S(1), Zeng J(1), Wang Y(2), Chu J(2), Chen Q(3), Chen J(3), Duan Y(4), Jin D(4), Huang J(5), Lu X(5), Guo Y(6), Shi X(6), Huo X(6), Su J(7), Cheng Y(7), Yin Y(8), Xin X(8), Sun Z(8), Zhao S(9), Miao H(9), Lou Z(10), Li J(10), Jiang J(11), Dong S(11).
ABSTRACT
OBJECTIVE: To investigate the epidemiology and the effectiveness of resuscitation from cardio-pulmonary arrest (CPA) among critically ill children and adolescents during pediatric intensive care unit (PICU) stay across China. METHODS: A prospective multicenter study was conducted in 11 PICUs in tertiary hospitals. Consecutively hospitalized critically ill children, from 29-day old to 18-year old, who had suffered from CPA and required cardiopulmonary resuscitation (CPR) in the PICU were enrolled (December 2017-October 2018). Data were collected and analyzed using the "in-hospital Utstein style." Neurological outcome was assessed with the Pediatric Cerebral Performance Category (PCPC) scale among children who had survived. Factors associated with the return of spontaneous circulation (ROSC) and survival at discharge were evaluated using multivariate logistic regression. RESULTS: Among 11,599 admissions to PICU, 372 children (3.2%) had CPA during their stay; 281 (75.5%) received CPR, and 91 (24.5%) did not (due to an order of "Do Not Resuscitate" requested by their guardians). Cardiopulmonary disease was the most common reason for CPA (28.1% respiratory and 19.6% circulatory). The most frequent initial dysrhythmia was bradycardia (79%). In total, 170 (60.3%) of the total children had an ROSC, 91 had (37.4%) survived till hospital discharge, 28 (11.5%) had survived 6 months, and 19 (7.8%) had survived for 1 year after discharge. Among the 91 children who were viable at discharge, 47.2% (43/91) received a good PCPC score (1-3). The regression analysis results revealed that the duration of CPR and the dose of epinephrine were significantly associated with ROSC, while the duration of CPR, number of CPR attempts, ventricular tachycardia/ventricular fibrillation (VT/VF), and the dose of epinephrine were significantly associated with survival at discharge. CONCLUSION: The prevalence of CPA in critically ill children and adolescents is relatively high in China. The duration of CPR and the dose of epinephrine

are associated with ROSC. The long-term prognosis of children who had survived after CPR needs further improvement.

2. Int Emerg Nurs. 2022 May 14;63:101173. doi: 10.1016/j.ienj.2022.101173. Online ahead of print.
Parental support needs during pediatric resuscitation: A systematic review.
Ghavi A(1), Hassankhani H(2), Powers K(3), Arshadi-Bostanabad M(4), Namdar-Areshtanab H(5), Heidarzadeh M(6).
ABSTRACT
BACKGROUND: Resuscitation of a child is one of the most critical times that parents need support, and parental support is fundamental to providing family-centered care in high acuity settings. The aim of this systematic review was to appraise and synthesize studies conducted to examine the support needs of parents during resuscitation of their child from their own perspective. METHOD: The PRISMA model guided the systematic literature search of Google Scholar, PubMed, Cochrane, Scopus, and Ovid for studies published until the end of 2020. Keywords used were: family support, family-centered care, family needs, resuscitation, CPR, children, neonatal, pediatric, family presence, family-witnessed, and parents. RESULTS: There were 787 articles located. After reviewing for relevancy, 21 articles met criteria and were included in this review. Findings indicate the needs of parents during resuscitation of their child include: Spiritual and cultural support; Communication with the child before and after resuscitation; Professional behavior from staff; Receiving information; Presence at resuscitation; Trust in the resuscitation team; and Having physical and mental needs met. CONCLUSION: Parents have differing support needs when their child is resuscitated in the hospital, and meeting these needs is critical for providing family-centered care.

3. Semin Spine Surg. 2022 May 8:100961. doi: 10.1016/j.semss.2022.100961. Online ahead of print.
Quality Improvement for Neonatal Resuscitation and Delivery Room Care.
Whitesel E(1), Goldstein J(2), Lee HC(3), GuptaMMSc M(1).
ABSTRACT
Quality improvement has become a foundation of neonatal care. Structured approaches to improvement can standardize practices, improve teamwork, engage families, and improve outcomes. The delivery room presents a unique environment for quality improvement; optimal delivery room care requires advanced preparation, adequately trained providers, and carefully coordinated team dynamics. In this article, we examine quality improvement for neonatal resuscitation. We review the published literature, focusing on reports targeting admission hypothermia, delayed cord clamping, and initial respiratory support. We discuss specific challenges related to delivery room quality improvement, including small numbers, data collection, and lack of benchmarking, and potential strategies to address them including simulation, checklists, and state and national collaboratives. We examine how quality improvement can target equity in delivery room outcomes, and explore the impact of the COVID-19 pandemic on delivery room quality of care.

EXTRACORPOREAL LIFE SUPPORT

1. Resuscitation. 2022 May 16:S0300-9572(22)00153-8. doi: 10.1016/j.resuscitation.2022.05.004. Online ahead of print.
Association of Chest Compression Pause Duration Prior to E-CPR Cannulation with Cardiac Arrest Survival Outcomes.
Lauridsen KG(1), Lasa JJ(2), Raymond TT(3), Yu P(4), Niles D(5), Sutton RM(5), Morgan RW(5), Fran Hazinski M(6), Griffis H(7), Hanna R(8), Zhang X(7), Berg RA(5), Nadkarni VM(5); pediRES-Q Investigators.

ABSTRACT
OBJECTIVE: To characterize chest compression (CC) pause duration during the last 5 minutes of pediatric cardiopulmonary resuscitation (CPR) prior to extracorporeal-CPR (E-CPR) cannulation and the association with survival outcomes. METHODS: Cohort study from a resuscitation quality collaborative including pediatric E-CPR cardiac arrest events ≥10 min with CPR quality data. We characterized CC interruptions during the last 5 min of defibrillator-electrode recorded CPR (prior to cannulation) and assessed the association between the longest CC pause duration and survival outcomes using multivariable logistic regression. RESULTS: Of 49 E-CPR events, median age was 2.0 [Q1, Q3: 0.6, 6.6] years, 55% (27/49) survived to hospital discharge and 18/49 (37%) with favorable neurological outcome. Median duration of CPR was 51 [43, 69] min. During the last 5 min of recorded CPR prior to cannulation, median duration of the longest CC pause was 14.0 [6.3, 29.4] sec: 66% >10 sec, 25% >29 sec, 14% >60 sec, and longest pause 168 sec. Following planned adjustment for known confounders of age and CPR duration, each 5-sec increase in longest CC pause duration was associated with lower odds of survival to hospital discharge [adjusted OR 0.89, 95%CI: 0.79-0.99] and lower odds of survival with favorable neurological outcome [adjusted OR 0.77, 95%CI: 0.60-0.98]. CONCLUSIONS: Long CC pauses were common during the last 5 min of recorded CPR prior to E-CPR cannulation. Following adjustment for age and CPR duration, each 5-second incremental increase in longest CC pause duration was associated with significantly decreased rates of survival and favorable neurological outcome.

EXPERIMENTAL RESEARCH

1. J Ultrasound Med. 2022 Jun;41(6):1425-1432. doi: 10.1002/jum.15825. Epub 2021 Sep 15.
Intracranial Pressure and Cerebral Hemodynamic Monitoring After Cardiac Arrest in Pediatric Pigs Using Contrast Ultrasound-Derived Parameters.
Shin SS(1), Sridharan A(2), Khaw K(2), Hallowell T(3), Morgan RW(3), Kilbaugh TJ(3), Hwang M(2).
ABSTRACT
OBJECTIVES: We explore the correlation of contrast-enhanced ultrasound (CEUS) parameters to intracranial pressure (ICP) in a porcine experimental model of pediatric cardiac arrest. METHODS: Eleven pediatric pigs underwent electrically induced cardiac arrest followed by cardiopulmonary resuscitation. ICP was measured using intracranial bolt monitor and CEUS was monitored through a cranial window. Various CEUS parameters were monitored at baseline, immediately post return of spontaneous circulation (ROSC), 1 hour-post ROSC, and 3 hours post-ROSC. RESULTS: There was significant ICP correlation with wash-out slope assessed by CEUS time intensity curve analysis at immediate post-ROSC. At 3 hours post-ROSC there was also significant negative correlation between ICP and peak enhancement which may be due to the evolution of anoxic injury. CONCLUSION: The use of CEUS in assessing disruption of cerebral hemodynamics and ICP post cardiac arrest will need future validation and comparison to other imaging modalities. The correlation between CEUS parameters and ICP may be due to the alterations in cerebral autoregulation that result from anoxic brain injury.

2. Resusc Plus. 2022 May 11;10:100243. doi: 10.1016/j.resplu.2022.100243. eCollection 2022 Jun.
Transcriptome and metabolome after porcine hemodynamic-directed CPR compared with standard CPR and sham controls.
Senthil K(1), Hefti MM(2), Singh LN(1), Morgan RW(1), Mavroudis CD(3), Ko T(4), Gaudio H(1), Nadkarni VM(1), Ehinger J(5)(6), Berg RA(1), Sutton RM(1), McGowan FX(1), Kilbaugh TJ(1).
ABSTRACT
OBJECTIVE: The effect of cardiac arrest (CA) on cerebral transcriptomics and metabolomics is unknown. We previously demonstrated hemodynamic-directed CPR (HD-CPR) improves survival with

favorable neurologic outcomes versus standard CPR (Std-CPR). We hypothesized HD-CPR would preserve the cerebral transcriptome and metabolome compared to Std-CPR. DESIGN: Randomized pre-clinical animal trial. SETTING: Large animal resuscitation laboratory at an academic children's hospital. SUBJECTS: Four-week-old female piglets (8-11 kg). INTERVENTIONS: Pigs (1-month-old), three groups: 1) HD-CPR (compression depth to systolic BP 90 mmHg, vasopressors to coronary perfusion pressure 20 mmHg); 2) Std-CPR and 3) shams (no CPR). HD-CPR and Std-CPR underwent asphyxia, induced ventricular fibrillation, 10-20 min of CPR and post-resuscitation care. Primary outcomes at 24 h in cerebral cortex: 1) transcriptomic analysis (n = 4 per treatment arm, n = 8 sham) of 1727 genes using differential gene expression and 2) metabolomic analysis (n = 5 per group) of 27 metabolites using one-way ANOVA, post-hoc Tukey HSD. MEASUREMENTS AND MAIN RESULTS: 65 genes were differentially expressed between HD-CPR and Std-CPR and 72 genes between Std-CPR and sham, but only five differed between HD-CPR and sham. Std-CPR increased the concentration of five AA compared to HD-CPR and sham, including the branched chain amino acids (BCAA), but zero metabolites differed between HD-CPR and sham. CONCLUSIONS: In cerebral cortex 24 h post CA, Std-CPR resulted in a different transcriptome and metabolome compared with either HD-CPR or sham. HD-CPR preserves the transcriptome and metabolome, and is neuroprotective. Global molecular analyses may be a novel method to assess efficacy of clinical interventions and identify therapeutic targets.

3. CJEM. 2022 May 19. doi: 10.1007/s43678-022-00313-0. Online ahead of print.

The impact of clinical result acquisition and interpretation on task performance during a simulated pediatric cardiac arrest: a multicentre observational study.

Rizkalla C(1), Garcia-Jorda D(2), Cheng A(3), Duff JP(4), Gottesman R(5), Weiss MJ(6), Koot DA(7), Gilfoyle E(8).

ABSTRACT

PURPOSE: The acquisition and interpretation of clinical results during resuscitations is common; however, this can delay critical clinical tasks, resulting in increased morbidity and mortality. This study aims to determine the impact of clinical result acquisition and interpretation by the team leader on critical task completion during simulated pediatric cardiac arrest before and after team training. METHODS: This is a secondary data analysis of video-recorded simulated resuscitation scenarios conducted during Teams4Kids (T4K) study (June 2011-January 2015); scenarios included cardiac arrest before and after team training. The scenario included either a scripted paper or a phone call delivery of results concurrently with a clinical transition to pulseless ventricular tachycardia. Descriptive statistics and non-parametric tests were used to compare team performance before and after training. RESULTS: Performance from 40 teams was analyzed. Although the time taken to initiate CPR and defibrillation varied depending on the type of interruption and whether the scenario was before or after team training, these findings were not significantly associated with the leader's behaviour [Kruskal-Wallis test ($p > 0.05$)]. An exact McNemar's test determined no statistically significant difference in the proportion of leaders involved or not in interpreting results between and after the training (exact p value = 0.096). CONCLUSIONS: Team training was successful in reducing time to perform key clinical tasks. Although team training modified the way leaders behaved toward the results, this behaviour change did not impact the time taken to start CPR or defibrillate. Further understanding the elements that influence

time to critical clinical tasks provides guidance in designing future simulated educational activities, subsequently improving clinical team performance and patient outcomes.

4. Eur J Pharmacol. 2022 May 16:175037. doi: 10.1016/j.ejphar.2022.175037. Online ahead of print.
Necrosulfonamide improves post-resuscitation myocardial dysfunction via inhibiting pyroptosis and necroptosis in a rat model of cardiac arrest.
He F(1), Zheng G(2), Hu J(3), Ge W(4), Ji X(5), Bradley JL(6), Peberdy MA(7), Ornato JP(8), Tang W(9).
ABSTRACT
The systemic inflammatory response following global myocardial ischemia/reperfusion (I/R) injury is a critical driver of poor outcomes. Both pyroptosis and necroptosis are involved in the systemic inflammatory response and contribute to regional myocardial I/R injury. This study aimed to explore the effect of necrosulfonamide (NSA) on post-resuscitation myocardial dysfunction in a rat model of cardiac arrest. Sprague-Dawley rats were randomly categorized to Sham, CPR and CPR-NSA groups. For rats in the latter two groups, ventricular fibrillation was induced without treatment for 6 min, with cardiopulmonary resuscitation (CPR) being sustained for 8 min. Rats were injected with NSA (10 mg/kg in DMSO) or vehicle at 5 min following return of spontaneous circulation. Myocardial function was measured by echocardiography, survival and neurological deficit score (NDS) were recorded at 24, 48, and 72 h after ROSC. Western blotting was used to assess pyroptosis- and necroptosis-related protein expression. ELISAs were used to measure levels of inflammatory cytokine. Rats in the CPR-NSA group were found to exhibit superior post-resuscitation myocardial function, and better NDS values in the group of CPR-NSA. Rats in the group of CPR-NSA exhibited median survival duration of 68 ± 8 h as compared to 34 ± 21 h in the CPR group. After treatment with NSA, NOD-like receptor 3 (NLRP3), GSDMD-N, phosphorylated-MLKL, and phosphorylated-RIP3 levels in cardiac tissue were reduced with corresponding reductions in inflammatory cytokine levels. Administration of NSA significantly improved myocardial dysfunction succeeding global myocardial I/R injury and enhanced survival outcomes through protective mechanisms potentially related to inhibition of pyroptosis and necroptosis pathways.

5. J Trauma Acute Care Surg. 2022 May 21. doi: 10.1097/TA.0000000000003705. Online ahead of print.
Valproic Acid During Hypotensive Resuscitation In Pigs With Trauma And Hemorrhagic Shock Does Not Improve Survival.
Martini WZ(1), Xia H, Ryan KL, Bynum J, Cap AP.
ABSTRACT
BACKGROUND: Valproic acid (VPA) has been extensively used for treatment of anxiety and seizure. Recent studies have shown that VPA has cellular protective effects in preclinical models following severe hemorrhage. This study investigated the effects of VPA on coagulation and survival in pigs after traumatic hemorrhage and hypotensive resuscitation. METHODS: Following baseline measurements, femur fracture was performed in 20 anesthetized and instrumented pigs (41 ± 2 kg), followed by hemorrhage of 55% of the estimated blood volume and a 10 min shock period. Pigs were then resuscitated over 30 min with: normal saline alone (NS group, n = 10, 4 ml/kg) or VPA solution (VPA group, n = 10, 90 mg/kg, 2 ml/kg of 45 mg VPA/ml, plus 2 ml NS/kg). All pigs were then monitored for 2 hrs or until death. Hemodynamics were recorded and blood samples were taken for blood and coagulation analysis (Rotem®) at baseline, after hemorrhage, resuscitation, and 2 hrs or death. RESULTS: Femur fracture and hemorrhage caused similar reductions in mean arterial pressure (MAP) and cardiac output and increase in heart rate in both groups. Resuscitation with NS or VPA did

not return these measurements to baseline. No differences were observed in hematocrit, pH, lactate, base excess, or total protein between the groups. Compared to NS, resuscitation with VPA decreased platelet counts and prolonged aPTT, with no differences in fibrinogen levels, PT, or any of the Rotem® measurements between the two groups. Neither survival rates (NS: 7 of 10 pigs and VPA: 7 of 10 pigs) nor survival times after resuscitation (NS: 97 ± 40 min and VPA: 98 ± 43 min) differed between the groups. CONCLUSIONS: Following traumatic hemorrhage and hypotensive resuscitation in pigs, VPA provides no benefit towards improving coagulation function or survival times.

CASE REPORTS

1. J Int Med Res. 2022 May;50(5):3000605221099255. doi: 10.1177/03000605221099255.
Takotsubo cardiomyopathy as an overlooked cause of cardiac arrest in a patient undergoing ureteral stenting: a case report and literature review.
Xu Y(1), Liu M(1), Li J(1), Rong J(1).

ABSTRACT

Takotsubo cardiomyopathy (TC) is a rare disease with unclear etiology that is characterized by wall motion abnormalities of the left ventricle. We report a 64-year-old woman who presented with cardiac arrest 6 hours after ureteral stenting, with no history of heart disease. Notably, she had a urinary tract infection preoperatively. TC was diagnosed with characteristic apical ballooning on the left ventriculogram. The hemodynamics and cardiac function recovered quickly within 1 day after conservative treatment and controlling the infection. TC should be considered when a patient presents with decreased cardiac function after ureteral stenting, especially in patients with potential concurrent infection. A review of the literature documenting cases of TC related to urological surgery in the past decade was conducted using PubMed. The results were summarized in a table.