This week's PubMed 7th – 13th August 2022: articles of interest n = 41

CPR AND COVID-19

1. Simul Healthc. 2022 Aug 5. doi: 10.1097/SIH.0000000000000679. Online ahead of print.
The Effect of a Plastic Barrier Drape on Resuscitation Performance and Provider Contamination: A Randomized Controlled Simulation-Based Pilot Trial.
Young LC(1), Lau J, Buan J, Duty O, Herrera T, Luu C, Rake A, Chan M, Bragg EA, Langga L, Guerrero E, Chang TP.

ABSTRACT
BACKGROUND: Patient barriers to protect health care workers from COVID-19 exposure have been studied for airway management. Few are tested for cardiopulmonary resuscitation (CPR). We sought to determine whether a plastic drape barrier affects resuscitation performance and contamination risks for a simulated cardiopulmonary arrest scenario. METHODS: This pilot trial randomized in-hospital resuscitation teams of 4 to 6 participants to a plastic drape or without a drape in an in situ cardiopulmonary arrest simulation. The mannequin's airway emanated simulated virus particles (GloGerm, Moab, UT), detectable through UV light. Primary outcomes included airway management and CPR quality measures. Secondary outcomes included visible contamination on personal protective equipment (PPE). We used the Non-Technical Skills (NO-TECHS) instrument to measure perceived team performance and the NASA Task Load Index (NASA-TLX) to measure individual workload. Outcome variables were analyzed using an analysis of covariance (ANCOVA) with participant number as a covariate. RESULTS: Seven teams were allocated to the intervention (plastic drape) group and 7 to the control. Intubation and ventilation performance ($\eta 2 = 0.09$, $P > 0.3$) and chest compression quality ($\eta 2 = 0.03$-0.19, $P > 0.14$) were not affected by the plastic drape. However, mean contaminated PPE per person decreased with the drape (2.8 ± 0.3 vs. 3.7 ± 0.3, partial $\eta 2 = 0.29$, $P = 0.05$). No differences in perceived workload nor team performance were noted ($P > 0.09$). CONCLUSIONS: In this pilot study, the use of a plastic drape barrier seems not to affect resuscitation performance on simulated cardiopulmonary arrest but decreases health care worker contamination risk. Further implementation trials could characterize the true risk reduction and any effect on resuscitation outcomes.

CPR/MECHANICAL CHEST COMPRESSION

1. Am J Emerg Med. 2022 Aug 3;60:116-120. doi: 10.1016/j.ajem.2022.07.057. Online ahead of print.
Comparison of blood flow between two mechanical compression devices using ultrasound: Animal trial.
Ryu JH(1), Min MK(2), Lee DS(1), Lee MJ(1), Chun MS(1), Hyun T(1), Shon SW(1).

ABSTRACT
BACKGROUND: During manual chest compression, maintaining accurate compression depth and consistency is a challenge. Therefore, mechanical chest compression devices(mCCDs) have been increasingly incorporated in clinical practice. Evaluation and comparison of the efficacy of these devices is critical for extensive clinical application. Hence, this study compared the cardiopulmonary resuscitation(CPR) efficiency of two chest compression devices, LUCAS™ 3(Physio-Control, Redmond, USA) and Easy Pulse (Schiller Medizintechnik GMBH, Feldkirchen, Germany), in terms of blood flow using ultrasonography(USG) in a swine model. METHODS: A swine model was used to compare two mCCDs, LUCAS™ 3 and Easy Pulse. Cardiac arrest was induced by injecting potassium chloride(KCl) solution in eight male mongrel pigs and the animals were randomly divided into two groups.

Mechanical CPR was provided to two groups using LUCAS™ 3(LUCAS™ 3 group) and Easy Pulse(Easy Pulse group). USG was used to measure hemodynamic parameters including femoral peak systolic velocity(PSV) and femoral artery diameters(diameter during systole and diastole). Blood flow rate was calculated by multiplying the PSV and cross-sectional area of the femoral artery during systole. The end-tidal carbon dioxide(EtCo2), chest compression depth was measured. Systolic blood pressure, mean blood pressure, and diastolic blood pressure were also measured using an arterial catheter. RESULTS: The chest compression depth was much deeper in LUCAS™ 3 group than Easy Pulse group(LUCAS™ 3: 6.80 cm; Easy Pulse: 3.279 cm, $p < 0.001$). However, EtCo2 was lower in the LUCAS™ 3 group(LUCAS™ 3: 19.8 mmHg; Easy Pulse: 33.4 mmHg, $p < 0.001$). The PSV was higher in the LUCAS™ 3 group(LUCAS™ 3: 67.6 cm s-1; Easy Pulse: 55.0 cm s-1, $p < 0.001$), while the systolic(LUCAS™ 3: 1.5 cm; Easy Pulse: 2.0 cm, $p < 0.001$) and diastolic diameters were larger in the Easy Pulse group(LUCAS™ 3: 0.4; Easy Pulse: 0.8 cm, $p < 0.001$). The femoral flood flow rate was also lower in the LUCAS™ 3 group(LUCAS™ 3: 32.55 cm3/s; Easy Pulse: 61.35 cm3/s, $p < 0.001$). CONCLUSION: The Easy Pulse had a shallower compression depth and slower PSV but had a wider systolic diameter in the femoral artery as compared to that in LUCAS™ 3. Blood flow and EtCo2 were higher in the easy pulse group probably because of the wider diameter. Therefore, an easy pulse may create and maintain more effective intrathoracic pressure.

2. Open Access Emerg Med. 2022 Aug 2;14:405-412. doi: 10.2147/OAEM.S368510. eCollection 2022.
Back Plate Marking of a Mechanical Chest Compression Device to Reduce the Duration of Chest Compression Interruptions.
Khunpanich S(1), Pethyabarn W(1).

ABSTRACT

OBJECTIVE: To compare the effectiveness of applying the back plate marking method vs the standard method, to a mechanical chest compression device, in regards to reducing the duration of chest compression interruptions during a simulated cardiac arrest. METHODS: An experimental study, one group pretest posttest design, conducted in a university-based hospital from November 2020 to October 2021. The study recruited 20 participants including emergency medical residents and paramedics. The participants were randomized into three-person teams and applied the device in both standard and back plate marking methods in sequential order. Teams were required to use a mechanical chest compression device in a manikin-based OHCA simulation to assess performance. RESULTS: The median time pause for the deployment of the upper part of the device was significantly reduced (16 vs 21s, $P < 0.01$) in the back plate marking method, as was the total pause for device deployment (31.5 vs 38.75s, $P = 0.03$) and the proportion of total hands-off time attributable to device application interruption (43.08% vs 49.18%, $P = 0.02$). There was no difference between groups in the duration of all compression interruptions (70.5 vs 82.75s, $P = 0.20$) and compression fractions (77.85 vs 76.91%, $P = 0.19$). CONCLUSION: The back plate marking method was a significantly reduced time of the deployment of the upper part of the device and in regards to the overall pause for device deployment, but there was no difference in CPR quality between the two methods.

REGISTRIES, REVIEWS AND EDITORIALS

1. Lancet Reg Health Eur. 2022 Aug 5;22:100477. doi: 10.1016/j.lanepe.2022.100477. eCollection 2022 Nov.
Ethnic disparities in out-of-hospital cardiac arrest: A population-based cohort study among adult Danish immigrants.

Garcia R(1)(2)(3), Rajan D(1), Warming PE(1), Svane J(1), Vissing C(1), Weeke P(1), Barcella CA(4)(5), Jabbari R(1), Gislason GH(4)(5), Torp-Pedersen C(6)(7), Petersen JH(8), Folke F(4)(9)(10), Tfelt-Hansen J(1)(11).

ABSTRACT

BACKGROUND: Ethnicity might impact out-of-hospital cardiac arrest (OHCA) risk, but it has scarcely been studied in Europe. We aimed to assess whether ethnicity influenced the risk of OHCA of cardiac cause in Danish immigrants and its interplay with risk factors for OHCA and socioeconomic status. METHODS: This nationwide study included all immigrants between 18 and 80 years present in Denmark at some point between 2001 and 2020. Regions of origin were defined as Africa, Arabic countries, Asia, Eastern Europe, Latin America, and Western countries. OHCAs with presumed cardiac cause were identified from the Danish Cardiac Arrest Registry. FINDINGS: Overall, among 1,011,565 immigrants, a total of 1,801 (0.2%) OHCAs (median age 64 (Q1-Q3 53-72) years, 72% males) occurred. The age- and sex- standardized (reference: Western countries) incidence of OHCA (/1,00,000 person-years) was 34.6 (27.8-43.4) in African, 34.1 (30.4-38.4) in Arabic, 33.5 (29.3-38.2) in Asian, 35.6 (31.9-39.6) in Eastern European, and 16.2 (9.0-27.2) in Latin American immigrants. When selecting Western origin as a reference, and after adjusting on OHCA risk factors, Arabic (HR 1.18, 95%CI 1.04-1.35; P=0.01), Eastern European (HR 1.28, 95%CI 1.13-1.46; P<0.001), and African origin (HR 1.34, 95%CI 1.10-1.63; P<0.01) were associated with higher risk of OHCA, whereas Latin American origin (HR 0.58, 95%CI 0.35-0.0.96; P=0.03) was associated with lower risk of OHCA. Comparable results were observed when adjusting on education level and economic status. INTERPRETATION: This study emphasizes that ethnicity is associated with OHCA risk, even when considering traditional cardiac arrest risk factors.

2. PLoS One. 2022 Aug 10;17(8):e0270986. doi: 10.1371/journal.pone.0270986. eCollection 2022.

The predictive performance of current termination-of-resuscitation rules in patients following out-of-hospital cardiac arrest in Asian countries: A cross-sectional multicentre study.

Hsu SH(1)(2), Sun JT(3), Huang EP(1)(2), Nishiuchi T(4), Song KJ(5), Leong B(6), Rahman NHNA(7), Khruekarnchana P(8), Naroo GY(9), Hsieh MJ(1), Chang SH(10), Chiang WC(1)(11), Huei-Ming Ma M(1)(11).

ABSTRACT

BACKGROUND: Termination-of-resuscitation rules (TORRs) in out-of-hospital cardiac arrest (OHCA) patients have been applied in western countries; in Asia, two TORRs were developed and have not been externally validated widely. We aimed to externally validate the TORRs using the registry of Pan-Asian Resuscitation Outcomes Study (PAROS). METHODS: PAROS enrolled 66,780 OHCA patients in seven Asian countries from 1 January 2009 to 31 December 2012. The American Heart Association-Basic Life Support and AHA-ALS (AHA-BLS), AHA-Advanced Life Support (AHA-ALS), Goto, and Shibahashi TORRs were selected. The diagnostic test characteristics and area under the receiver operating characteristic curve (AUC) were calculated. We further determined the most suitable TORR in Asia and analysed the variable differences between subgroups. RESULTS: We included 55,064 patients in the final analysis. The sensitivity, specificity, negative predictive value, positive predictive value, and AUC, respectively, for AHA-BLS, AHA-ALS, Goto, Shibashi TORRs were 79.0%, 80.0%, 19.6%, 98.5%, and 0.80; 48.6%, 88.3%, 9.8%, 98.5%, and 0.60; 53.8%, 91.4%, 11.2%, 99.0%, and 0.73; and 35.0%, 94.2%, 8.4%, 99.0%, and 0.65. In countries using the Goto TORR with PPV<99%, OHCA patients were younger, had more males, a higher rate of shockable rhythm, witnessed collapse, pre-hospital defibrillation, and survival to discharge, compared with countries using the Goto TORR with PPV ≥99%. CONCLUSIONS: There was no single TORR fit for all Asian countries. The Goto TORR can be considered the most suitable; however, a high predictive performance with PPV ≥99% was not achieved in three countries using it (Korea, Malaysia, and Taiwan).

3. Resuscitation. 2022 Aug 6:S0300-9572(22)00637-2. doi: 10.1016/j.resuscitation.2022.08.003. Online ahead of print.

Trends in EMS-attended Out-of-Hospital Cardiac Arrest Survival, United States 2015-2019.

Odom E(1), Nakajima Y(2), Vellano K(2), Al-Araji R(2), Coleman King S(1), Zhang Z(1), Merritt R(1), McNally B(2).

ABSTRACT

AIM: Everyday, nearly 1000 U.S. adults experience out-of-hospital cardiac arrest (OHCA). Survival to hospital discharge varies across many factors, including sociodemographics, location of arrest, and whether bystander intervention was provided. The current study examines recent trends in OHCA survival by location of arrest using a cohort of emergency medical service (EMS) agencies that contributed data to the Cardiac Arrest Registry to Enhance Survival. METHODS: The 2015 CARES cohort (N=122,613) includes EMS agencies contributing data across five consecutive years, 2015-2019. We assessed trends in EMS-attended OHCA survival for the 2015 CARES cohort by location of arrest - public, residential, nursing home. Unadjusted and adjusted percentages were estimated using 3-level hierarchical logistic regression models among cases aged 18-65 years. RESULTS: Overall, survival from EMS-attended OHCA significantly increased from 12.5% in 2015 to 13.8% in 2019 (p=0.001). Survival from bystander witnessed arrests also increased significantly from 17.8% in 2015 to 19.7% in 2019 (p=0.004). The trend for survival increased overall and for bystander witnessed OHCAs occurring in public places and nursing homes. CONCLUSION: Increasing trends for EMS-attended OHCA survival were observed in the overall and bystander witnessed groups. No change in the trend for survival was observed among OHCAs in the groups most likely to have a desirable outcome - bystander witnessed, with a shockable rhythm, and receiving bystander intervention. Reporting and monitoring of OHCA may be an important first step in improving outcomes. Additional community interventions focused on bystander CPR and AED use may be warranted.

4. Resusc Plus. 2022 Jul 27;11:100277. doi: 10.1016/j.resplu.2022.100277. eCollection 2022 Sep.

Sensor technologies to detect out-of-hospital cardiac arrest: A systematic review of diagnostic test performance.

Hutton J(1)(2)(3), Lingawi S(1)(3)(4)(5), Puyat JH(3)(6), Kuo C(3)(4), Shadgan B(3)(4)(7)(5), Christenson J(3)(6)(8), Grunau B(2)(3)(6)(8).

ABSTRACT

AIM: Cardiac arrest (CA) is the cessation of circulation to vital organs that can only be reversed with rapid and appropriate interventions. Sensor technologies for early detection and activation of the emergency medical system could enable rapid response to CA and increase the probability of survival. We conducted a systematic review to summarize the literature surrounding the performance of sensor technologies in detecting OHCA. METHODS: We searched the academic and grey literature using keywords related to cardiac arrest, sensor technologies, and recognition/ detection. We included English articles published up until June 6, 2022, including investigations and patent filings that reported the sensitivity and specificity of sensor technologies to detect cardiac arrest on human or animal subjects. (Prospero# CRD42021267797). RESULTS: We screened 1666 articles and included four publications examining sensor technologies. One tested the performance of a physical sensor on human participants in simulated CA, one tested performance on audio recordings of patients in cardiac arrest, and two utilized a hybrid design for testing including human participants and ECG databases. Three of the devices were wearable and one was an audio detection algorithm utilizing household smart technologies. Real-world testing was limited in all studies. Sensitivity and specificity for the sensors ranged from 97.2 to 100% and 90.3 to 99.9%, respectively. All included studies had a medium/high risk of bias, with 2/4 having a high risk of bias.

CONCLUSIONS: Sensor technologies show promise for cardiac arrest detection. However, current evidence is sparse and of high risk of bias. Small sample sizes and databases with low external validity limit the generalizability of findings.

5. Am J Emerg Med. 2022 Sep;59:118-120. doi: 10.1016/j.ajem.2022.07.006. Epub 2022 Jul 8.
Sudden cardiac arrest in commercial airports: Incidence, responses, and implications.
Shekhar AC(1), Ruskin KJ(2).
ABSTRACT
Billions of travelers pass through airports around the world every year. Airports are a relatively common location for sudden cardiac arrest when compared with other public venues. An increased incidence of cardiac arrest in airports may be due to the large volume of movement, the stress of travel, or adverse effects related to the physiological environment of airplanes. Having said that, airports are associated with extremely high rates of witnessed arrests, bystander interventions (eg. CPR and AED use), shockable arrest rhythms, and survival to hospital discharge. Large numbers of people, a high density of public-access AEDs, and on-site emergency medical services (EMS) resources are probably the major reasons why cardiac arrest outcomes are so favorable at airports. The success of the chain of survival found at airports may imply that applying similar practices to other public venues will translate to improvements in cardiac arrest survival. Airports might, therefore, be one model of cardiac arrest preparedness that other public areas should emulate.

6. Resuscitation. 2022 Aug 6:S0300-9572(22)00636-0. doi: 10.1016/j.resuscitation.2022.08.002. Online ahead of print.
Patient characteristics and survival outcomes of cardiac arrest in the cardiac catheterization laboratory: Insights from get with the Guidelines®-Resuscitation registry.
Elkaryoni A(1), Tran AT(2), Saad M(3), Darki A(4), Lopez JJ(4), Abbott JD(3), Chan PS(5); American Heart Association's Get With the Guidelines®-Resuscitation Investigators.
ABSTRACT
BACKGROUND: Characteristics and outcomes of patients with in-hospital cardiac arrest (IHCA) in the cardiac catheterization laboratory (CCL) have not been well-described. Thus, we compared the outcomes of patients with an IHCA in the CCL versus those in the intensive care unit (ICU) and operating rooms (OR). METHODS: Within the American Heart Association's Get With the Guidelines®-Resuscitation registry, we identified patients ≥ 18 years old with IHCA in the CCL, ICU, or OR between 2000-2019. Using hierarchical multivariable logistic regression, we compared rates of survival to discharge for patients with IHCA in the CCL versus ICU and OR. RESULTS: Across 428 hospitals, 193,950 patients had IHCA, of whom 6865, 181,905 and 5180 were in the CCL, ICU and OR, respectively. Overall, 2614 (38.1%) patients with IHCA in the CCL survived to discharge, whereas 30,830 (16.9%) and 2096 (40.5%) survived to discharge from the ICU and OR, respectively. After adjustment, patients with IHCA in CCL were more likely to survive to discharge as compared to those with IHCA in the ICU (odds ratio, 1.37 [95%CI: 1.29-1.46], $p < 0.001$). In contrast, those who had IHCA in the CCL were less likely to survive to discharge as compared to patients with IHCA in the OR (odds ratio, 0.81 [95%CI: 0.69-0.94], $p = 0.006$). CONCLUSION: IHCA in the CCL is not uncommon and has a lower survival rate when compared with IHCA in the OR. The reasons for this difference deserve further study given that cardiac arrest in both settings is witnessed and response time should be similar.

7. Am J Emerg Med. 2022 Sep;59:30-36. doi: 10.1016/j.ajem.2022.06.014. Epub 2022 Jun 20.
Hypernatremia is associated with poor long-term neurological outcomes in out-of-hospital cardiac arrest survivors.

Cho EJ(1), Lee MS(2), Kwon WY(3), Shin J(4), Suh GJ(3), Jung YS(1), Song WJ(5), Yeo G(6), Jo YH(7); SNU CARE Investigators.

ABSTRACT

BACKGROUND: Brain oedema after cardiac arrest is strongly associated with poor neurological outcomes. Excessive sodium supplementation may increase serum osmolarity and facilitate brain oedema development in cardiac arrest survivors. We aimed to investigate the association of serum sodium levels with long-term neurological outcomes in out-of-hospital cardiac arrest (OHCA) survivors. METHODS: This retrospective observational study used a multicentre prospective cohort registry of OHCA survivors collected between December 2013 and February 2018. We analyzed the association of serum sodium levels at the return of spontaneous circulation (ROSC) (Sodium 0H) and at 24 h after ROSC (Sodium 24H) with 1-year neurological outcomes in OHCA survivors. Patients with 1-year cerebral performance categories (CPC) 1 and 2 were included in the good outcome group while those with CPC 3, 4, and 5 were included in the poor outcome group. RESULTS: Among 277 patients, 84 (30.3%) and 193 (69.7%) were in the good and poor outcome groups, respectively. Compared with the good outcome group, the poor outcome group showed significantly higher Sodium 24H levels (140 mEq/L vs. 137.4 mEq/L, $p < 0.001$). Increased serum sodium levels per 1 mEq/L increased the risk of poor 1-year CPC by 13% (adjusted odds ratio = 1.13; 95% CI, 1.04–1.23; $p = 0.004$). CONCLUSIONS: Relatively high Sodium 24H levels showed a strong and independent association with poor long-term neurological outcomes in OHCA survivors. These findings may be applied in therapeutic strategies for improving neurological outcomes in OHCA survivors.

IN-HOSPITAL CARDIAC ARREST

1. Resusc Plus. 2022 Jul 27;11:100280. doi: 10.1016/j.resplu.2022.100280. eCollection 2022 Sep.

The association between CPR quality of In-hospital resuscitation and sex: A hypothesis generating, prospective observational study.

Dadon Z(1)(2), Fridel T(3)(2), Einav S(3)(2).

ABSTRACT

INTRODUCTION: The relationship between sex and cardiopulmonary resuscitation (CPR) outcomes remains unclear. Particularly, questions remain regarding the potential contribution of unmeasured confounders. We aimed to examine the differences in the quality of chest compression delivered to men and women. METHODS: Prospective study of observational data recorded during consecutive resuscitations occurring in a single tertiary center (Feb-1-2015 to Dec-31-2018) with real-time follow-up to hospital discharge. The studied variables included time in CPR, no-flow-time and fraction, compression rate and depth and release velocity. The primary study endpoint was the unadjusted association between patient sex and the chest compression quality (depth and rate). The secondary endpoint was the association between the various components of chest compression quality, sex, and survival to hospital discharge/neurologically intact survival. RESULTS: Overall 260 in-hospital resuscitations (57.7% male patients) were included. Among these 100 (38.5%) achieved return of spontaneous circulation (ROSC) and 35 (13.5%) survived to hospital discharge. Female patients were significantly older. Ischemic heart disease and ventricular arrhythmias were more prevalent among males. Compression depth was greater in female vs male patients (54.9 ± 11.3 vs 51.7 ± 10.9 mm; $p = 0.024$). Other CPR quality-metrics were similar. The rates of ROSC, survival to hospital discharge and neurologically intact survival did not differ between males and females. Univariate analysis revealed no association between sex, quality metrics and outcomes. DISCUSSION: Women received deeper chest compressions during in-hospital CPR. Our findings require corroboration in larger cohorts but nonetheless underscore the need to maintain high-quality CPR in all patients using real-time feedback devices. Future studies should also include data on ventilation rates and volumes which may contribute to survival outcomes.

2. Ann Palliat Med. 2022 Aug 3:apm-22-266. doi: 10.21037/apm-22-266. Online ahead of print.
Weekend effect on the mortality rate of in-hospital cardiopulmonary resuscitations from 2010 through 2019: a retrospective population-based cohort study.
Oh TK(1), Jo YH(2), Song IA(3).
ABSTRACT
BACKGROUND: A smaller number of in-hospital medical staff and professionals on the weekend may lead to worsened survival outcomes in patients who have receive in-hospital cardiopulmonary resuscitation (ICPR). However, information regarding the effect of the weekend on survival outcomes after ICPR remains lacking. Therefore, we aimed to evaluate the "weekend effect" on the 6-month and 1-year mortality after ICPR. METHODS: This population-based cohort study was based on data extracted from the National Health Insurance Service database in South Korea. We enrolled 298,676 adult (≥18 years old) patients who had experienced ICPR due to in-hospital cardiac arrest (IHCA) between January 1, 2010, and December 31, 2019. The primary endpoints were 6-month and 1-year mortality after ICPR. Propensity score matching (PSM) was used to adjust clinical covariates. RESULTS: The survival analysis before and after PSM, 6-month mortality [pre-PSM hazard ratio (HR) =1.04, 95% confidence interval (CI): 1.03-1.04, P<0.001; post-PSM HR =1.02, 95% CI: 1.01-1.03, P<0.001], and 1 year mortality (pre-PSM HR =1.03, 95% CI: 1.03-1.04, P<0.001; post-PSM HR =1.02, 95% CI: 1.01-1.03, P<0.001) of the patients who received ICPR on weekends was higher than those on weekdays. The results of the multivariable Cox regression model for 1-year mortality among the entire cohort indicated that there were significant associations between high 1-year mortality after ICPR and the confounders (weekend vs. weekday: HR =1.04, 95% CI: 1.03-1.05, P<0.001). CONCLUSIONS: The "weekend effect" on ICPR survival outcomes lasted up to 1 year in South Korea. Fasttracking development of a rapid cardiac intervention delivery system and employing an increased number of professionals on weekends can improve the weekend ICPR mortality rates. Further investigation is required into improvements that can be made to the current ICPR system.

3. BMJ Open Qual. 2022 Aug;11(3):e001614. doi: 10.1136/bmjoq-2021-001614.
Impact of a standardised rapid response system on clinical outcomes of female patients: an interrupted time series approach.
Chen J(1)(2), Ou L(3)(2), Hillman K(3)(2), Parr M(4)(5), Flabouris A(6)(7), Green M(8).
ABSTRACT
BACKGROUND: This study aimed to assess the impact of a standardised rapid response systems (the Between the Flags (BTF)) implemented across New South Wales (NSW), Australia, among female patients. METHODS: We conducted an interrupted time series (2007-2013) population-based linkage study including 5 114 170 female patient (≥18 years old) admissions in all 232 public hospitals in NSW. We studied changes in levels and trends of patient outcomes after BTF implementation among four age groups of female patients. RESULTS: Before the BTF system introduction (2007-2009), for the female patients as a whole, there was a progressive decrease in rates of in-hospital cardiopulmonary arrest (IHCA), IHCA-related mortality and hospital mortality for female patients. However, there were no changes in deaths in low-mortality diagnostic-related groups (DLMDRGs), IHCA survival to discharge and 1-year post-discharge mortality after surviving an IHCA. Only the female patients aged 55 years and older showed the same results as the whole sample. After the BTF programme (2010-2013), the same trends (except for DLMDRG) continued for female patients as a whole and for those aged 55 years or older. There was a significant reduction in DLMDRG among female patients aged 35-54 years (p<0.001), those aged 75 years and over (p<0.05) and female patients as a whole (p<0.05). The decreasing secular trend of surviving an IHCA to hospital discharge before the BTF system (p<0.05) among patients aged 18-34 years old was reversed after the BTF implementation (p<0.01). CONCLUSIONS: For female patients the BTF programme introduction was associated with continued reductions in the rates of IHCA, IHCA-related mortality and hospital

mortality, as well as a new reduction in DLMDRG for 35-54 years old patients and those aged 75 years and older, and increased survival for those aged 18-34 years who had suffered an IHCA.

INJURIES AND CPR

No articles identified.

CAUSE OF THE ARREST

No articles identified.

END-TIDAL CO_2

No articles identified.

ORGAN DONATION

1. Open Access Emerg Med. 2022 Aug 5;14:413-420. doi: 10.2147/OAEM.S361930. eCollection 2022.
Program of Uncontrolled Donation After Circulatory Death as Potential Solution to the Shortage of Organs: A Canadian Single-Center Retrospective Cohort Study.
D'Aragon F(1)(2), Lachance O(1), Lafleur V(1), Ortega-Deballon I(3)(4), Masse MH(5), Trepanier G(6), Lamarche D(1), Battista MC(5).
ABSTRACT
PURPOSE: Worldwide, the number of patients waiting for organ transplantation exceeds the number of organs available. Program for uncontrolled donation after circulatory death (uDCD) implemented in Europe has resulted in a 10-15% expansion of the donor pool. We aimed to describe the number of patients eligible for an uDCD program in a regional tertiary care center. METHODS: We conducted a retrospective cohort study in a Canadian tertiary academic center located in a rural area including all adults who received cardiopulmonary resuscitation in 2016 and died in the emergency department (ED) or during their hospitalization. The primary outcome was the number of patients eligible for uDCD defined as aged between 18 and 60 years old whose collapse was witnessed and where the time between cardiac arrest to cardiopulmonary resuscitation and ED arrival was, respectively, less than 30 and 120 minutes. As a secondary outcome, we determined the number of patients eligible for controlled donation after circulatory death. RESULTS: Of the 130 patients included, 84 did not return to spontaneous circulation. We identified 15 potential uDCD candidates, with a mean age of 46.6 (95% Confidence Interval [CI] 41.3 to 52) years. Twelve had an out-of-hospital cardiac arrest with a mean time between collapse and arrival to the ED of 43.2 (29.8 to 56.6) minutes. Among the 46 patients who died after a return of spontaneous circulation, 10 (21.7%) were eligible for organ donation after circulatory death. CONCLUSION: Implementing an uDCD program in a tertiary hospital covering a rural area could increase the number of donors.

2. Transplant Proc. 2022 Aug 4:S0041-1345(22)00421-3. doi: 10.1016/j.transproceed.2022.05.020. Online ahead of print.
Incidence of Ischemia Reperfusion Injury Related Biliary Complications in Liver Transplantation: Effect of Different Types of Donors.

Guo Y(1), Wang J(1), Wu W(1), Huang D(1), Zheng H(1), Xu Z(1), Li X(1), Wang N(1), Qin J(1), Zhu Z(1), Liu Y(1), Yao Z(2), Wang H(3), Huang Q(4), Liu L(1), Nashan B(5).

ABSTRACT

Liver transplantation from donors after circulatory death (DCD) is associated with considerable rates of primary nonfunction and ischemic-type biliary lesions. Compared with donation was after brain death (DBD), the biggest disadvantage of DCD is warm ischemia injury in the procurement stage. Donation after brain death followed by circulatory death (DBCD) is a unique practice in China. Such donors should donate according to the DCD procedure, that is, remove life support and donate after cardiac arrest. We retrospectively analyzed donor and recipient characteristics with preoperative and postoperative parameters according to 3 donation types to comprehensively describe incidence of ischemia reperfusion injury (IRI) related biliary complications among different donor type adult liver transplantation recipients. A total of 50 patients were included in this study (DBD group n = 17, DCD group n = 26, DBCD group n = 7). Only 1 patient, whose donor type was DBCD was diagnosed with ischemic-type biliary lesions demonstrated cast and retrograde ascending cholangitis. Rates of primary graft non-function (DBD n = 1, 5.9%; DCD n = 2, 7.7%; DBCD, 0%; P = .546) were similar and total biliary complications (DBD n = 1, 5.9%; DCD n = 1, 3.8%; DBCD N = 2, 28.6%; P = .042) were different. No differences were found regarding development of postreperfusion syndrome or coagulopathy in 3 groups. Compared with standard DBD donor, the clinical outcome of DCD donor liver transplantation was satisfactory, with no increase in the incidence of IRI, and, no difference in the incidence of ischemic bile duct complications. This work was carried out in compliance with the Helsinki Congress and the Declaration of Istanbul.

FEEDBACK

No articles identified.

DRUGS

1. Am J Cardiol. 2022 Aug 4:S0002-9149(22)00717-2. doi: 10.1016/j.amjcard.2022.06.042. Online ahead of print.

Meta-Analysis of Efficacy of Vasopressin During Cardiopulmonary Resuscitation.

Elbadawi A(1), Tan BE(2), Assaf Y(3), Elzeneini M(4), Baig B(5), Hamed M(6), Elgendy IY(7), Mamas M(8).

ABSTRACT

Randomized controlled trials evaluating the efficacy of vasopressin versus standard of care during cardiopulmonary resuscitation (CPR) have yielded conflicting results. An electronic search of MEDLINE, Cochrane, and Embase databases was conducted through February 2022 for randomized controlled trials that evaluated the outcomes of vasopressin versus standard of care during CPR among patients with cardiac arrest. The primary outcome was the likelihood of spontaneous circulation (ROSC) return. Data were pooled using the random-effects model. The final analysis included 11 trials with 6,609 patients. The weighted mean age was 65.5 years, and 68.2% were men. There was no significant difference between the vasopressin and control groups in the likelihood of ROSC (33.1% vs 31.9%, odds ratio [OR] 1.23, 95% confidence interval [CI] 0.98 to 1.55). Subgroup analyses suggested that the use of vasopressin versus control increased the likelihood of ROSC when used in combination with steroids (pinteraction = 0.01) and in cases of in-hospital cardiac arrest (pinteraction = 0.01). There was no significant difference between the vasopressin and control groups in the likelihood of favorable neurological outcome (OR 1.14, 95% CI 0.75 to 1.71), in-hospital

mortality (OR 0.89, 95% CI 0.60 to 1.31), or ventricular arrhythmias (OR 0.93, 95% CI 0.44 to 1.97). In conclusion, compared with the standard of care, the use of vasopressin during CPR did not increase the likelihood of ROSC among patients with cardiac arrest. There was no difference between the vasopressin and control groups in the likelihood of the favorable neurological outcome, in-hospital mortality, or ventricular arrhythmias.

TRAUMA

1. Eur J Trauma Emerg Surg. 2022 Aug;48(4):3357-3372. doi: 10.1007/s00068-022-01941-y. Epub 2022 Mar 25.

Prehospital traumatic cardiac arrest: a systematic review and meta-analysis.

Vianen NJ(1), Van Lieshout EMM(1), Maissan IM(2), Bramer WM(3), Hartog DD(1), Verhofstad MHJ(1), Van Vledder MG(4).

ABSTRACT

BACKGROUND: Circulatory arrest after trauma is a life-threatening situation that mandates urgent action. The aims of this systematic review and meta-analysis on prehospital traumatic cardiac arrest (TCA) were to provide an updated pooled mortality rate for prehospital TCA, to investigate the impact of the time of patient inclusion and the type of prehospital trauma system on TCA mortality rates and neurological outcome, and to investigate which pre- and intra-arrest factors are prognostic for prehospital TCA mortality. METHODS: This review was conducted in accordance with the PRISMA and CHARMS guidelines. Databases were searched for primary studies published about prehospital TCA patients (1995-2020). Studies were divided into various EMS-system categories. Data were analyzed using MedCalc, Review Manager, Microsoft Excel, and Shinyapps Meta Power Calculator software. RESULTS: Thirty-six studies involving 51.722 patients were included. Overall mortality for TCA was 96.2% and a favorable neurological outcome was seen in 43.5% of the survivors. Mortality rates were 97.2% in studies including prehospital deaths and 92.3% in studies excluding prehospital deaths. Favorable neurological outcome rates were 35.8% in studies including prehospital deaths and 49.5% in studies excluding prehospital deaths. Mortality rates were 97.6% if no physician was available at the prehospital scene and 93.9% if a physician was available. Favorable neurological outcome rates were 57.0% if a physician was available on scene and 38.0% if no physician was available. Only non-shockable rhythm was associated with a higher mortality (RR 1.12, p = 0.06). CONCLUSION: Approximately 1 in 20 patients with prehospital TCA will survive; about 40% of survivors have favorable neurological outcome.

VENTILATION

No articles identified.

CERERBRAL MONITORING

No articles identified.

ULTRASOUND AND CPR

No articles identified.

ORGANISATION AND TRAINING

1. J Cardiovasc Nurs. 2022 Aug 5. doi: 10.1097/JCN.0000000000000937. Online ahead of print.
Factors Associated With Symptoms of Prolonged Grief and Psychological Distress Among Bereaved Family Members of Persons Who Died From Sudden Cardiac Arrest.
Carlsson N, Årestedt K, Alvariza A, Axelsson L, Bremer A.

ABSTRACT
BACKGROUND: Death from sudden cardiac arrest implies a stressful and challenging situation for bereaved family members with an increased risk of prolonged grief disorder and psychological distress. OBJECTIVES: The aims of this study were (1) to explore the associations between symptoms of prolonged grief and psychological distress and (2) to identify factors associated with symptoms of prolonged grief and psychological distress among bereaved family members of persons who died from sudden cardiac arrest. METHODS: This cross-sectional survey included bereaved adult family members. Demographic data and measures of prolonged grief (Prolonged Grief Disorder-13), anxiety and depression (Hospital Anxiety and Depression Scale), posttraumatic stress (Posttraumatic Stress Disorder Checklist for DSM-5), and perceived social support (Multidimensional Scale of Perceived Social Support) were analyzed using Spearman's correlations (rs) as well as univariate and multiple linear regression analyses. RESULTS: In total, 108 family members participated. Significant associations between symptoms of prolonged grief, anxiety, depression, and posttraumatic stress were identified (rs = 0.69-0.79, P < .001). Offered, sought, and/or received professional support from healthcare, lower levels of perceived social support, being a spouse of the deceased, female sex, younger age, and family presence during resuscitation were significantly associated with higher symptom levels of prolonged grief, anxiety, depression, and/or posttraumatic stress. CONCLUSIONS: The results indicate that family members with higher levels of symptoms were offered, sought, and/or received professional support. However, because a minority are offered professional support after deaths from cardiac arrest, future interventions need to proactively identify family members in need of support. Furthermore, perceived social support seems to be an important factor for family members of persons who died from cardiac arrest.

2. BMC Cardiovasc Disord. 2022 Aug 10;22(1):369. doi: 10.1186/s12872-022-02782-8.
Physical function, psychological adjustment, and self-efficacy following sudden cardiac arrest and an initial implantable cardioverter defibrillator (ICD) in a social cognitive theory intervention: secondary analysis of a randomized control trial.
Dougherty CM(1), Liberato ACS(2)(3), Streur MM(2), Burr RL(2), Kwan KY(2), Zheng T(2), Auld JP(2), Thompson EA(2).

ABSTRACT
BACKGROUND: Sudden cardiac arrest (SCA) survivorship results in unique issues in return to physical and psychological function. The purpose of the study was to compare recovery across the first year between SCA survivors and other arrhythmia patients who received a first-time implantable cardioverter defibrillator (ICD) for secondary prevention, participating in a social cognitive theory (SCT) intervention. METHODS: 168 (129 males, 39 females) who received an ICD for secondary prevention (SCA N = 65; other arrhythmia N = 103) were randomized to one of two study conditions: SCT intervention (N = 85) or usual care (N = 83). Outcomes were measured at baseline hospital discharge, 1, 3, 6, & 12 months: (1) Physical Function: Patient Concerns Assessment (PCA), SF-36 (PCS); (2) Psychological Adjustment: State Trait Anxiety (STAI), CES-D depression, SF-36 (MCS); (3) Self-Efficacy: Self-Efficacy (SCA-SE), Self-management Behaviors (SMB), Outcome Expectations (OE). Outcomes were compared over 12 months for intervention condition x ICD indication using general estimating equations. RESULTS: Participants were Caucasian (89%), mean age 63.95 ± 12.3 years, EF% 33.95 ± 13.9, BMI 28.19 ± 6.2, and Charlson Index 4.27 ± 2.3. Physical symptoms (PCA) were

higher over time for SCA survivors compared to the other arrhythmia group (p = 0.04), ICD shocks were lower in SCA survivors in the SCT intervention (p = 0.01); psychological adjustment (MCS) was significantly lower in SCA survivors in the SCT intervention over 6 months, which improved at 12 months (p = 0.05); outcome expectations (OE) were significantly lower for SCA survivors in the SCT intervention (p = 0.008). CONCLUSIONS: SCA survivors had greater number of physical symptoms, lower levels of mental health and outcome expectations over 12 months despite participation in a SCT intervention.

3. Medicine (Abingdon). 2022 Aug 3. doi: 10.1016/j.mpmed.2022.06.007. Online ahead of print.
Cardiopulmonary resuscitation.
Mitropoulou P(1)(2), Fitzsimmons S(1)(2).
ABSTRACT
Performing cardiopulmonary resuscitation is a key competency for healthcare professionals. Training in immediate and advanced life support is a requirement for UK doctors; this is depicted in the Foundation training programme competencies and in the Internal Medicine Training curriculum. It requires being able to identify unwell patients, perform a structured assessment and treatment approach, master relevant procedural aspects and demonstrate non-technical skills including leading the resuscitation team. The Resuscitation Council UK has recently provided updated guidance on basic and advanced life support. These guidelines align with similar international guidelines, taking into account evidence from clinical trials of cardiac arrest management and national data on cardiac arrest outcomes in the community and in the hospital. The guidance includes considerations regarding individuals with suspected or confirmed coronavirus disease (COVID-19). The complex ethical aspects around escalation of care, advance care planning, 'Do Not Attempt Cardiopulmonary Resuscitation' decisions and communication with patients and their loved ones are also discussed. This chapter summarizes the current guidance on cardiopulmonary resuscitation.

4. Cardiovasc J Afr. 2022 Aug 12;33:1-7. doi: 10.5830/CVJA-2022-039. Online ahead of print.
Clinical profile and outcomes of young patients treated with implantable cardioverter defibrillators at a South African tertiary hospital: a review of two decades of implantable cardioverter defibrillator implantation and follow up.
Mkoko P(1), Solomon K(2), Chin A(3).
ABSTRACT
AIM: In young patients without atherosclerotic coronary artery disease, the aetiology of sudden cardiac death (SCD) has been described in Europe and North America. However, there are important regional variations and there are limited data on the aetiology and outcome of SCD in South Africa. The objective of this study was to determine the profile and outcomes of young patients treated with implantable cardioverter defibrillators (ICDs) at a South African tertiary hospital. METHODS: This study was designed as a retrospective review of patients aged 35 years or younger implanted with ICDs at Groote Schuur Hospital. RESULTS: During the study period, 38 patients younger than 35 years were implanted with ICDs. The mean (standard deviation) age at ICD implantation was 25.1 (7.6) years and 63.2% were male. A secondary-prevention ICD was implanted in 57.9% of the patient population, and primary prevention in the remaining 42.1%. Patients with secondary-prevention ICDs presented with ventricular tachycardia (59.1%), ventricular fibrillation (31.8%) and receipt of cardiopulmonary resuscitation but no recorded electrocardiograms (9.1%). Arrhythmogenic right ventricular cardiomyopathy (ARVC) was the leading cause of SCD in the secondary-prevention patient population (36.4%). Idiopathic dilated cardiomyopathy accounted for 50% of the primary-prevention patient population. After a median (interquartile range) follow up 32 (14-90) months, 7.9% died and 5.2% received a heart transplant; 42.1% of the study population received appropriate

ICD shock therapies and 18.4% received inappropriate shock therapies. CONCLUSIONS: In this single-centre study from South Africa, ARVC and repaired congenital heart disease were the leading causes of SCD in patients younger than 35 years treated with secondary-prevention ICDs. Primary-prevention ICDs were frequently implanted for idiopathic dilated cardiomyopathy.

5. Int J Arrhythmia. 2022;23(1):19. doi: 10.1186/s42444-022-00070-2. Epub 2022 Aug 1.
Two decades of implantable cardioverter defibrillator implantation and follow-up at a South African referral centre: trends, indications and long-term outcomes in a resource-limited setting.
Mkoko P(1)(2), Solomon K(2), Chin A(1)(2).
ABSTRACT
BACKGROUND: More than two-thirds of cardiovascular deaths occur in low- and middle-income countries. Sudden cardiac deaths (SCD) from ventricular arrhythmias are an important cause of cardiovascular deaths. Implantable cardioverter defibrillators (ICD) are an important therapeutic strategy for detecting and terminating ventricular arrhythmias in patients at risk of SCD. The profile of patients treated with ICDs in South Africa is unknown. Further, with changing lines of evidence, the implantation trends are undetermined. The objectives of this study were to determine the profile of ICD recipients and implantation trends in a South African quaternary hospital. METHODS: This was a retrospective review of all patients implanted with ICDs at Groote Schuur Hospital from 01 January 1998 to 31 December 2020. A standardised data collection form was used to collect baseline demographic data, information on clinical presentation and ICD follow-up data for the history of ICD shock therapies. RESULTS: A total of 253 ICDs were implanted; 75% for secondary prevention and 25% for primary prevention. 67.2% of the implanted ICDs were single-chamber ICDs, dual-chamber ICDs were implanted in 12.3% and Cardiac resynchronisation with a defibrillator (CRT-D) in 20.6%. There was an upward trajectory of ICD implantations during the study period. Increasing numbers of dual-chamber devices and CRT-D were implanted over time. ICD recipients had a mean (standard deviation) age of 50 (14) years and were predominantly male (69%). Primary prevention ICD recipients were younger than secondary prevention recipients, with a mean (SD) age of 46 (14) years versus 51 (14) years, p = 0.019. The secondary prevention group presented with ventricular tachycardia in 81%, ventricular fibrillation in 13% and cardiopulmonary resuscitation without documented heart rhythm in 5.3% (10/190). After a median (interquartile range) follow-up of 44 (15; 93) months, there was an overall mortality rate of 16.2%, with no mortality difference between the primary and secondary prevention patient groups. CONCLUSION: There is an increase in the annual number of ICDs implanted at a South African referral centre. ICDs are predominantly implanted for secondary prevention. However, over time the number of devices implanted for primary prevention is steadily increased. During follow-up, there was no mortality difference between the primary prevention and the secondary prevention groups.

6. Cureus. 2022 Jul 6;14(7):e26610. doi: 10.7759/cureus.26610. eCollection 2022 Jul.
The Reality of Medical Reality Television: Analysis of Physician Demographics, Trauma, and Cardiopulmonary Resuscitation (CPR) Characteristics.
Lichak BP(1), Olympia RP(2).
ABSTRACT
Background Television and media have a profound effect on viewers' understanding and interpretation of the world we live in. Reality television can be even more influential to viewers given its depiction of "real life". Materials and methods Every episode (n=46) was analyzed from five medical reality television shows. Hopkins, Boston Med, NY Med, Vanderbilt MDs, and Lenox Hill were selected based on criteria requiring the show to be a reality show or docuseries that recorded unscripted patient interactions in the inpatient setting or emergency department. Results

Of the 185 physicians shown on medical reality television, most were male (76.8%), white (80.0%), and surgeons (62.2%). Of the 417 patients shown on television, 72 patients had a traumatic mechanism of injury. Traumatic mechanisms included injury due to motor vehicle accident (29.2%), firearm (26.4%), cutting/piercing (12.5%), fall (12.5%), and fire/flame/hot substance (6.9%). Twenty-two of the 417 patients required cardiopulmonary resuscitation (CPR). Seven patients (31.8%) experienced cardiac arrest due to a traumatic mechanism of injury. Conclusions There was an overrepresentation of male physicians, white physicians, and surgeons on medical reality television compared to current demographic data on physicians ($p<0.01$). Traumatic mechanisms of injury by firearm, cutting/piercing, fire/flame/hot substance and traumatic causes of cardiac arrest were over-represented on television compared to current trauma and CPR registry data ($p<0.01$). This skewed "reality" of medicine as a non-diverse landscape riddled with trauma has the potential to profoundly impact viewers' understanding of medical professionals and the medical field.

POST-CARDIAC ARREST TREATMENTS

1. Kardiol Pol. 2022 Aug 8. doi: 10.33963/KP.a2022.0187. Online ahead of print.
Improved outcomes in survivors of cardiac arrest qualified to early coronary angiography - a single tertiary centre study.
Simiera M(1), Miśkowiec D(2), Mrozowska-Peruga E(2), Nowakowska M(2), Kłosińska M(2), Kasprzak JD(2).
ABSTRACT
INTRODUCTION: Most cardiac arrests in adults is related to coronary artery disease (CAD) and the role of early invasive cardiology procedures remains unsettled. AIMS: We investigated the prognosis of patients hospitalized due to out-of hospital cardiac arrest (OHCA) or in-hospital cardiac arrest (IHCA) and referred within 24 hours for admission to tertiary cardiology department, regarding the role of early coronary angiography (CA) and percutaneous coronary intervention (PCI). METHODS: This was an observational, single-centre study using a retro and prospective cohort. Consecutive patients hospitalized due to OHCA or IHCA and referred within 24 hours for admission to cardiology department were in the study. Survival to hospital discharge was the primary outcome. RESULTS: 148 patients aged 71 (14) years were included, 68 hospitalized due to OHCA and 80 patients after IHCA. Overall, in-hospital survival in the study group was 45% (66/148). In a multivariable logistic regression model, independent predictors of death were: ejection fraction (EF) ≤30% (odds ratio [OR], 4.1; 95% confidence interval [CI], 1.69-10.03), blood oxygen saturation (SpO_2) ≤90% (OR, 2.77; 95% CI, 1.19-6.46), non-ST elevation myocardial infarction (NSTEMI) (OR, 2.71; 95% CI, 1.02-7.21). Risk of death was lower in patients who underwent early CA (OR, 0.28; 95% CI, 0.1-0.74) or received at least one defibrillation (OR, 0.11; 95% CI, 0.05-0.27), even after adjustment for other factors. CONCLUSIONS: In this series from a tertiary cardiac centre, patients who underwent early CA had improved outcomes after cardiac arrest. In multivariable logistic regression model lower SpO_2, lower EF and NSTEMI were independent risk factors for death, whereas early CA and initial shockable rhythm improved survival.

2. Int J Cardiol. 2022 Oct 1;364:1-8. doi: 10.1016/j.ijcard.2022.06.006. Epub 2022 Jun 3.
Impact of emergent coronary angiography after out-of-the-hospital cardiac arrest without ST-segment elevation - A systematic review and meta-analysis.
Alves N(1), Mota M(2), Cunha M(3), Ribeiro JM(4).
ABSTRACT
INTRODUCTION: Coronary artery disease is a leading cause of out-of-the-hospital cardiac arrest (OHCA). However, there is no consensus on whether OHCA patients without ST-segment elevation (STE) benefit from emergent (ie < 2 h) coronary angiography (CAG). Our aim was to assess the impact of emergent CAG in no-STE OHCA patients. METHODS: We performed a systematic review

and meta-analysis by searching the MEDLINE, Cochrane, Scopus, CINAHL and JBI databases for randomized controlled trials (RCTs) comparing emergent CAG versus standard of care (ie CAG >2 h after OHCA or not performed) in no-STE OHCA patients of presumed cardiac aetiology. The primary outcome was short term survival. Secondary outcomes included survival with good neurological outcome, mid-term survival, left ventricle ejection fraction (LVEF), acute kidney injury (AKI) and renal replacement therapy (RRT), ventricular arrhythmias and major bleeding during hospital stay. RESULTS: Seven RCTs met the inclusion and exclusion criteria and were included; one was included only in the analysis of mid-term survival and another in the LVEF analysis. Five studies (1278 patients, 643 with early CAG and 635 with no early CAG) were included in the analysis of the primary endpoint. The groups were balanced for all baseline characteristics but previous PCI, which was more frequent in the standard of care groups. There were no significant differences between groups for short-term survival (57 vs 61%; OR0.85, 95% CI0.68-1.07; I2 = 0%). There were also no differences for any of the secondary endpoints. CONCLUSION: Routine emergent CAG did not improve survival in comatose survivors of OHCA with shockable rhythm and no-STE.

TARGETED TEMPERATURE MANAGEMENT

1. Chest. 2022 Aug;162(2):356-366. doi: 10.1016/j.chest.2022.02.056. Epub 2022 Mar 19.
Targeted Temperature Management After In-Hospital Cardiac Arrest: An Ancillary Analysis of Targeted Temperature Management for Cardiac Arrest With Nonshockable Rhythm Trial Data.
Blanc A(1), Colin G(2), Cariou A(3), Merdji H(4), Grillet G(5), Girardie P(6), Coupez E(7), Dequin PF(8), Boulain T(9), Frat JP(10), Asfar P(11), Pichon N(12), Landais M(13), Plantefeve G(14), Quenot JP(15), Chakarian JC(16), Sirodot M(17), Legriel S(18), Massart N(19), Thevenin D(20), Desachy A(21), Delahaye A(22), Botoc V(23), Vimeux S(24), Martino F(25), Reignier J(1), Taccone FS(26), Lascarrou JB(27).

ABSTRACT
BACKGROUND: Targeted temperature management (TTM) currently is the only treatment with demonstrated efficacy in attenuating the harmful effects on the brain of ischemia-reperfusion injury after cardiac arrest. However, whether TTM is beneficial in the subset of patients with in-hospital cardiac arrest (IHCA) remains unclear. RESEARCH QUESTION: Is TTM at 33 °C associated with better neurological outcomes after IHCA in a nonshockable rhythm compared with targeted normothermia (TN; 37 °C)? STUDY DESIGN AND METHODS: We performed a post hoc analysis of data from the published Targeted Temperature Management for Cardiac Arrest with Nonshockable Rhythm randomized controlled trial in 584 patients. We included the 159 patients with IHCA; 73 were randomized to 33 °C treatment and 86 were randomized to 37 °C treatment. The primary outcome was survival with a good neurologic outcome (cerebral performance category [CPC] score of 1 or 2) on day 90. Mixed multivariate adjusted logistic regression analysis was performed to determine whether survival with CPC score of 1 or 2 on day 90 was associated with type of temperature management after adjustment on baseline characteristics not balanced by randomization. RESULTS: Compared with TN for 48 h, hypothermia at 33 °C for 24 h was associated with a higher percentage of patients who were alive with good neurologic outcomes on day 90 (16.4% vs 5.8%; P = .03). Day 90 mortality was not significantly different between the two groups (68.5% vs 76.7%; P = .24). By mixed multivariate analysis adjusted by Cardiac Arrest Hospital Prognosis score and circulatory shock status, hypothermia was associated significantly with good day 90 neurologic outcomes (OR, 2.40 [95% CI, 1.17-13.03]; P = .03). INTERPRETATION: Hypothermia at 33 °C was associated with better day 90 neurologic outcomes after IHCA in a nonshockable rhythm compared with TN. However, the limited sample size resulted in wide CIs. Further studies of patients after cardiac arrest resulting from any cause, including IHCA, are needed.

2. Chest. 2022 Aug;162(2):281-282. doi: 10.1016/j.chest.2022.03.007.
We Must Keep Our Cool Regarding the Effect of Therapeutic Hypothermia After In-Hospital Cardiac Arrest.
Skrifvars MB(1), Jakobsen JC(2).
NO ABSTRACT AVAILABLE

ELECTROPHYSIOLOGY AND DEFIBRILLATION

1. Resusc Plus. 2022 Aug 3;11:100284. doi: 10.1016/j.resplu.2022.100284. eCollection 2022 Sep.
Ex vivo evaluation of personal protective equipment in hands-on defibrillation.
Stephens AF(1)(2), Šeman M(1)(3)(4), Nehme Z(3)(5)(6), Voskoboinik A(4)(6)(7), Smith K(5), Gregory SD(1)(2), Stub D(3)(4)(5).
ABSTRACT
BACKGROUND: Defibrillation guidelines recommend avoiding patient contact during shock delivery. However, hands-on defibrillation (compressions during shock) and manual pressure augmentation (MPA - pushing on the defibrillator pads during shock) may lead to improved clinical outcomes. There are limited data addressing the protection provided by personal protective equipment (PPE) during hands-on defibrillation and MPA. This study investigated the hand-to-hand and hand-to-knee leakage current experienced by a simulated kneeling provider wearing different PPE. METHODS: A defibrillator was used in experiments on a pork shoulder, investigating three different hands-on positions: closed fist on defibrillator pads; open palm on pads with inadvertent finger contact (overhang); and open palm on the chest. Evaluated PPE included single and double gloves (nitrile and latex) and rescuer cargo trousers in wet and dry conditions (N = 126 experiments). RESULTS: Mean hand-to-hand leakage currents in MPA without PPE was 0.41 mA (0.2-0.74 mA) and with PPE was 0.2 mA (0.08-0.58 mA). For experiments involving finger or palm contact on the chest, wearing any PPE resulted in a >99% reduction in mean leakage currents from an average 354.58 mA (258.96-446.22 mA) to an average 0.48 mA (0.16-1.56 mA). Rescuer trousers were insulative in dry conditions even without gloves (0.2-1.2 mA). CONCLUSION: This study demonstrated that the tested clinical examination gloves markedly reduced leakage current to the rescuer and that the lowest levels of leakage current occurred during MPA attributed to the electrical insulation of the pads.

PEDIATRICS AND CHILDREN

1. Pediatr Emerg Care. 2022 Aug 5. doi: 10.1097/PEC.0000000000002806. Online ahead of print.
Survival Rates After Pediatric Traumatic Out-of-Hospital Cardiac Arrest Suggest an Underappreciated Therapeutic Opportunity.
Lanyi M(1), Elmer J, Guyette FX(2), Martin-Gill C(2), Venkat A(3), Traynor O(4), Walker H(5), Seaman K, Kochanek PM, Fink EL.
ABSTRACT
OBJECTIVES: Children with traumatic arrests represent almost one third of annual pediatric out-of-hospital cardiac arrests (OHCAs). However, traumatic arrests are often excluded from study populations because survival posttraumatic arrest is thought to be negligible. We hypothesized that children treated and transported by emergency medical services (EMS) personnel after traumatic OHCA would have lower survival compared with children treated after medical OHCA. METHODS: We performed a secondary, observational study of children younger than 18 years treated and transported by 78 EMS agencies in southwestern Pennsylvania after OHCA from 2010 to 2014. Etiology was determined as trauma or medical by EMS services. We analyzed patient, cardiac arrest,

and resuscitation characteristics and ascertained vital status using the National Death Index. We used multivariable logistic regression to test the association of etiology with mortality after covariate adjustment. RESULTS: Forty eight of 209 children (23%) had traumatic OHCA. Children with trauma were older than those with medical OHCA (13.2 [3.8-15.9] vs 0.5 [0.2-2.4] years, P < 0.001). Prehospital return of spontaneous circulation frequency for trauma versus medical etiology was similar (90% vs 87%, P = 0.84). Patients with trauma had higher mortality (69% vs 45% P = 0.004). CONCLUSIONS: More than 8 of 10 children with EMS treated and transported OHCA achieved return of spontaneous circulation. Despite lower survival rates than medical OHCA patients, almost one third of children with a traumatic etiology survived throughout the study period. Future research programs warrant inclusion of children with traumatic OHCA to improve outcomes.

2. PLoS One. 2022 Aug 8;17(8):e0271636. doi: 10.1371/journal.pone.0271636. eCollection 2022.
New chest compression method in infant resuscitation: Cross thumb technique.
Jeon W(1), Kim J(1), Ko Y(2), Lee J(2).
ABSTRACT
BACKGROUND: The two-thumb encircling technique (2TT) is superior to the two-finger technique (2FT) in infant cardiopulmonary resuscitation (CPR), but there are difficulties in providing ventilation as soon as possible. We modified the 2TT to the cross-thumb technique (CTT) to maintain good CPR performance at the same position as 2FT. We aimed to compare the quality of chest compression and brief hands-off times in 2FT, 2TT, and CTT by a single rescuer using an infant CPR manikin model. METHODS: This study was designed as a prospective randomized controlled simulation-based study. We used the Resusci® Baby QCPR (Laerdal Medical, Stavanger, Norway) as a simulated 3-month-old infant. Ventilation was performed by the mouth-to-mouth technique using a chest compression-to-ventilation ratio of 30:2 as a single rescuer. Data on CPR quality, such as locations, rates, depth and release of chest compressions, hands-off times, and proper ventilation, were recorded using the Resusci® Baby QCPR and SkillReporter. Also, the chest compression fraction (CCF) was automatically calculated. RESULTS: The depth of chest compression in 2FT, 2TT, and CTT were 40.0 mm (interquartile range [IQR] 39.0, 41.0), 42.0 mm (IQR 41.0, 43.0), and 42.0 mm (IQR 41.0, 43.0), respectively. The depth of chest compression in 2FT was shallower than that in the other two techniques (P<0.05). CCF in 2FT, 2TT, and CTT were 73.9% (IQR 72.2, 75.6), 71.2% (IQR 67.2, 72.2) and 71.3% (IQR 67.7, 74.1), respectively. CCF was higher in 2FT than in the other two techniques (P<0.05). Correct location in 2FT, 2TT, and CTT were 99.0% (IQR 86.0, 100.0), 100.0% (IQR 97.0, 100.0) and 100.0% (IQR 99.0, 100.0), respectively. Correct location in CTT and 2TT was higher than that in 2FT. Performing CTT, the subjective pain and fatigue score were lower than other two technique. CONCLUSION: A new chest compression technique, CTT was better in chest compression depth compared with 2FT and may be helpful in maintaining correct chest compression location with less pain and fatigue in infant CPR.

3. Pediatr Emerg Care. 2022 Aug 9. doi: 10.1097/PEC.0000000000002815. Online ahead of print.
Teaching Cardiopulmonary Resuscitation and Defibrillation in Children.
Tse E, Plakitsi K, Voulgaris S, Alexiou GA.
NO ABSTRACT AVAILABLE

EXTRACORPOREAL LIFE SUPPORT

1. Resuscitation. 2022 Aug 4;179:71-77. doi: 10.1016/j.resuscitation.2022.07.038. Online ahead of print.

Early withdrawal of life sustaining therapy in extracorporeal cardiopulmonary resuscitation (ECPR): Results from the Extracorporeal Life Support Organization registry.

Carlson JM(1), Etchill E(2), Whitman G(2), Kim BS(3), Choi CW(4), Tonna JE(5), Geocadin R(6), Cho SM(7).

ABSTRACT

AIMS: Although extracorporeal cardiopulmonary resuscitation (ECPR) improves survival outcomes in refractory cardiac arrest, morbidity and mortality remain significantly high. Information on causes of death in ECPR is limited; however, some evidence suggests withdrawal of life sustaining therapy (WLST) is a major factor in ECPR-associated mortality. We sought to describe the patients experiencing WLST after ECPR. METHODS: The international Extracorporeal Life Support Organization (ELSO) Registry was retrospectively queried for patients more than 18 years old supported with ECPR who underwent WLST due to family request from 2007 to 2017. These patients were split into groups for descriptive and multivariable analysis: early (WLST < 72 hours from cannulation) and routine WLST. RESULTS: Overall, 411 ECPR patients experienced WLST (median age 42 years IQR = 28-51; 31.7% female) over the 10-year period. 55.5% (n = 228) underwent early WLST with a median ECPR duration of 24 hours (IQR = 7-48) versus routine WLST (median = 147 hours; IQR = 105-238). In multivariable regression analysis, lower arterial blood gas pH (aOR = -3.1; 95% CI = 2.18-2.8; p = 0.04), arterial oxygen saturation (aOR = 1.12; 95% CI = 1.01-1.23; p = 0.02), and higher peak inspiratory pressure (aOR = 0.84; 95% CI = 0.71-1.00; p = 0.05) were independently associated with early WLST. Early WLST patients experienced higher rates of all ECMO-related complications except for infections. CONCLUSIONS: More than half of ECPR patients experienced early WLST within 72 hours. The patients with early WLST had worse markers of severe critical illness at 24 hours and experienced higher rates of complications. Further research should include an appropriate control group to better adjust confounders for ECPR-associated death and focus on prognostication.

EXPERIMENTAL RESEARCH

1. Shock. 2022 Aug 9. doi: 10.1097/SHK.0000000000001971. Online ahead of print.

Head and thorax elevation prevents the rise of intracranial pressure during extracorporeal resuscitation in swine.

Levy Y, Hutin A, Polge N, Lidouren F, Fernandez R, Kohlhauer M, Leger PL, Rambaud J, Debaty G(1), Lurie K, Ghaleh B, Lamhaut L(2), Tissier R.

ABSTRACT

AIM: Head and thorax elevation during cardio-pulmonary resuscitation improves cerebral hemodynamics and ultimate neurological outcome after cardiac arrest. Its effect during extracorporeal cardiopulmonary resuscitation (E-CPR) is unknown. We tested whether this procedure could improve hemodynamics in swine treated by E-CPR.Methods and ResultsPigs were anaesthetized and submitted to 15 min of untreated ventricular fibrillation followed by E-CPR. Animals randomly remained in flat position (flat group) or underwent head and thorax elevation since E-CPR institution (head-up group). Electric shocks were delivered after 30 min until return of spontaneous circulation (ROSC). They were followed during 120-min after ROSC. After 30 min of E-CPR, ROSC was achieved in all animals, with no difference regarding blood pressure, heart rate and extra-corporeal membrane of oxygenation flow among groups. The head-up group had an attenuated increase in ICP as compared to the flat group following cardiac arrest (13 ± 1 vs 26 ± 2 mmHg at the end of the follow-up, respectively). Cerebral perfusion pressure tended to be higher in the head-up vs flat group despite not achieving statistical difference (66 ± 1 vs 46 ± 1 mmHg at the end of the follow-up). Carotid blood flow and cerebral oxygen saturation were not significantly different among groups. CONCLUSIONS: During E-CPR, head and thorax elevation prevents ICP

increase. Whether it could improve the ultimate neurological outcome in this situation deserves further investigation.

2. Shock. 2022 Jul 26. doi: 10.1097/SHK.0000000000001964. Online ahead of print.
Long non-coding RNA up-regulates adapter ShcA protein expression to promote cognitive impairment after cardiac arrest and resuscitation.
Zhang YH, Peng F, Zhang L, Kang K, Yang M, Chen C, Yu H.
ABSTRACT
AIM: More patients are resuscitated from cardiac arrest and cardiopulmonary resuscitation (CA/CPR) due to advances in medical care. However, the burden now lies with post-cardiac arrest cognitive impairment in CA/CPR survivors. Based on our previous study, we aimed to further confirm the correlation between the long non-coding lncRNA-promoting ShcA (lncRNA-PS)/Src homology and Collagen A (ShcA) axis and CA/CPR-induced cognitive impairment in molecular, cellular and tissue levels. METHODS AND RESULTS: The in vivo experiments were based on a mouse model of CA/CPR, while oxygen-glucose deprivation and reoxygenation (OGD/R) was used as a cell model in vitro. Conditional ShcA suppression in neurons of the hippocampal CA1 region was achieved by cyclization recombinase of bacteriophage P1 recognizing DNA fragment locus of x-over P1 site (Cre/LoxP recombination system). Genetic manipulation of HT22 was achieved by lentivirus targeting lncRNA-PS and ShcA. Neurological function score was remarkably decreased and cognitive function was affected after restoration of spontaneous circulation. LncRNA-PS and ShcA overexpression after CA/CPR, mainly happened in neurons of hippocampal CA1 region, were observed by in situ hybridization and immunofluorescence. Neuronal ShcA knockdown in hippocampal CA1 region before CA/CPR attenuated cognitive impairment after CA/CPR. ShcA deficiency protected HT22 cell line against OGD/R by inhibiting inflammation and apoptosis. In vitro upregulation of lncRNA-PS elevated ShcA expression which was reversed by knockdown of ShcA. CONCLUSIONS: This study revealed that lncRNA-PS/ShcA axis is critically involved in the pathogenesis of cognitive impairment after CA/CPR. By inhibiting ShcA expression in neurons of the hippocampal CA1 region could improve the survival outcomes in mice after CA/CPR.

CASE REPORTS

1. Eur Heart J Cardiovasc Imaging. 2022 Aug 22;23(9):e327. doi: 10.1093/ehjci/jeac105.
Incidental finding of primary cardiac lymphoma after cardiac arrest and percutaneous coronary intervention.
Kane C(1), Bosio F(2), Wrench D(3), Webb J(1).
NO ABSTRACT AVAILABLE

2. J Emerg Med. 2022 Aug 5:S0736-4679(22)00298-0. doi: 10.1016/j.jemermed.2022.04.028. Online ahead of print.
Severe Vertebral Body Fracture-Dislocation as a Result of Chest Compressions: A Case Report.
Capone E(1), Durfey N(1).
ABSTRACT
BACKGROUND: Although high-quality chest compressions are an essential, lifesaving component of cardiopulmonary resuscitation, injuries are common with both manual and mechanical chest compressions. CASE REPORT: We discuss the case of a 77-year-old woman who sustained thoracic vertebral fractures after cardiopulmonary resuscitation involving both manual and mechanical chest compressions. WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?: Routine post-cardiac arrest care should include evaluation for chest compression-related injury. If a patient has back pain,

focal vertebral tenderness, or paraplegia after chest compressions, imaging to evaluate for vertebral fracture should be performed. If unable to assess for back pain or tenderness, consider imaging to evaluate for vertebral fracture in patients with kyphosis or osteopenia, as these patients are at higher risk for chest compression vertebral injury.

3. Am J Emerg Med. 2022 Aug 8:S0735-6757(22)00510-1. doi: 10.1016/j.ajem.2022.08.007. Online ahead of print.

Endovascular thrombectomy using a stent retriever catheter for massive pulmonary thromboembolism.

Ichiyama S(1), Maruhashi T(2), Kitamura R(3), Kurihara Y(3), Kinoshita D(4), Sato N(4), Ishizue N(4), Ikeda Y(4), Asari Y(3).

ABSTRACT

Acute massive pulmonary thromboembolism (PE) has a high mortality rate of 18%-65%. Along with anticoagulation and thrombolytic therapy, treatment may require a catheter-based thrombectomy or surgical thrombectomy. We report a case of pulmonary thromboembolism treated with a Stent Retriever (Trevo® NXT ProVue Retriever, Stryker, Kalamazoo, MI, USA), which is commonly used to treat stroke. An 81-year-old woman complained of back pain and was transported to our hospital after she became unconscious. Cardiopulmonary resuscitation was initiated before her arrival at the hospital; she returned to spontaneous circulation after arrival. After undergoing computed tomography (CT) scanning, she went into cardiac arrest again, and we established veno-arterial extracorporeal membrane oxygenation and performed catheter thrombectomy using a stent retriever. The left basilar pulmonary artery and the right middle pulmonary artery trunk were retrieved after the stent's deployment, and bilateral pulmonary arteries were confirmed to be reopened. A residual thrombus was present, and Monteplase was administered. A contrast-enhanced CT scan taken on day 15 following admission revealed that the thrombus had disappeared, and echocardiography revealed improved right ventricular dysfunction. The patient was transferred to another hospital on day 64 for rehabilitation. We report the first case of pulmonary artery thrombosis that was successfully recanalized by endovascular treatment with a stent retriever. The stent retriever may be useful as an endovascular treatment device for PE because it is easier to achieve recanalization using this method compared to conventional treatment methods.

4. Am J Emerg Med. 2022 Jul 31:S0735-6757(22)00497-1. doi: 10.1016/j.ajem.2022.07.054. Online ahead of print.

A successful case of resuscitation from cardiac arrest with tension gastrothorax due to acquired diaphragmatic hernia.

Miyahara M(1), Kondo N(1), Sugiyama T(2), Matsumura Y(3).

ABSTRACT

Tension gastrothorax is a rare cause of obstructive shock induced by a distended stomach herniating into the thorax through a diaphragmatic defect. We report the process of diagnosis and emergency treatment for tension gastrothorax during cardiopulmonary resuscitation (CPR). A 71-year-old woman with multiple surgical histories had nausea and vomiting for two days. She was transferred to our hospital with circulatory failure and loss of consciousness. She presented pulseless electric activity and received CPR immediately after arrival. The right atrium and right ventricle were collapsed in the echocardiography. A chest X-ray demonstrated a dilated intestine extending from the peritoneal cavity to the mediastinum. The nasogastric tube (NGT) drained 1000 mL of stomach content and alleviated the abdominal distension, and spontaneous circulation returned immediately after the drainage. Thoracoabdominal CT showed the stomach and the transverse colon had escaped from the peritoneal cavity to the mediastinum. We diagnosed the situation as tension gastrothorax

due to an acquired diaphragmatic hernia. History of multiple surgery and multiple operative scars was the first step of the diagnostic process, and the chest X-ray during CPR was the key to the diagnosis. Tension gastrothorax can be misdiagnosed as other conditions. A chest X-ray should be preceded in non-trauma settings, unlike the setting of a tension pneumothorax in trauma patients. Gastrointestinal decompression with NGT placement could be attempted quickly to improve the hemodynamic condition.

5. World J Pediatr Congenit Heart Surg. 2022 Aug 11:21501351221117715. doi: 10.1177/21501351221117715. Online ahead of print.
Congenital Left Main Coronary Atresia: Rare Cause of Sudden Cardiac Arrest.
Knapp TM(1), Farias M(1)(2), DeCampli WM(1)(3).
ABSTRACT
A 13-month-old male sustained cardiac arrest under general anesthesia and was found to have left main coronary artery atresia with collateralization from the right coronary artery. After protracted recovery, the patient underwent coronary ostioplasty. Postoperative imaging confirmed patency of the newly established artery without stenosis. At 12 months, no changes in the vessel were noted. Ventricular function remains mildly decreased and stable.

6. Unfallchirurgie (Heidelb). 2022 Aug 10. doi: 10.1007/s00113-022-01220-w. Online ahead of print.
[Prehospital perimortem cesarean section during cardiopulmonary resuscitation for traumatic cardiac arrest : Case report and lessons learned].
[Article in German; Abstract available in German from the publisher]
Wolff J(1), Breuer F(2), von Kottwitz K(3), Poloczek S(4), Röschel T(5), Dahmen J(6)(7).
ABSTRACT
The following case report discusses the resuscitation of a pregnant woman in traumatic cardiac arrest after a fall from a height with consecutive resuscitative hysterotomy for maternal and fetal salvage. The report illustrates all lessons learned from critical appraisal amid new guideline recommendations and gives an overview of the published literature on the matter. Despite extensive resuscitation efforts, ultimately both the mother and the newborn were pronounced life extinct at the scene. Prehospital treatment of (traumatic) cardiac arrest in a pregnant patient as well as performing a perimortem cesarean section remain infrequent but challenging scenarios.

7. Turk J Emerg Med. 2022 Jul 1;22(3):159-162. doi: 10.4103/2452-2473.348437. eCollection 2022 Jul-Sep.
A rare complication of cardiopulmonary resuscitation applied during transportation by ambulance: A case report of flail chest.
Yurtsever G(1), Yamanoglu A(1), Bora ES(1), Topal FE(1).
ABSTRACT
Cardiopulmonary resuscitation (CPR) to be applied during patient transfer by ambulance differs from CPR applied in the field or in the hospital in terms of physical condition. Especially the deeper and faster chest compressions recommended in the latest CPR guidelines, when administered during ambulance transport, may result in a further increase in traumatic CPR complications. However, in the current CPR guidelines, there are no clear recommendations regarding additional measures that can be taken to reduce the complications and increase the efficiency of CPR during patient transport. In this study, a case of flail chest that developed after short-term CPR application during ambulance transport is presented. The aim of this study was to evaluate the flail chest complication and solution suggestions that may occur due to chest compressions applied during transportation.