

REGISTRES I REVISIONS

1. Sao Paulo Med J. 2015 Dec 8. pii: S1516-31802015005008103. [Epub ahead of print]

Elevated gamma glutamyl transferase levels are associated with the location of acute pulmonary embolism. Cross-sectional evaluation in hospital setting.

Korkmaz O1, Yucel H2, Zorlu A2, Berkan O1, Kaya H2, Goksel S1, Beton O2, Yilmaz MB2.

Abstract

CONTEXT AND OBJECTIVE:

The location of embolism is associated with clinical findings and disease severity in cases of acute pulmonary embolism. The level of gamma-glutamyl transferase increases under oxidative stress-related conditions. In this study, we investigated whether gamma-glutamyl transferase levels could predict the location of pulmonary embolism.

DESIGN AND SETTING:

Hospital-based cross-sectional study at Cumhuriyet University, Sivas, Turkey.

METHODS:

120 patients who were diagnosed with acute pulmonary embolism through computed tomography-assisted pulmonary angiography were evaluated. They were divided into two main groups (proximally and distally located), and subsequently into subgroups according to thrombus localization as follows: first group (thrombus in main pulmonary artery; n = 9); second group (thrombus in main pulmonary artery branches; n = 71); third group (thrombus in pulmonary artery segmental branches; n = 34); and fourth group (thrombus in pulmonary artery subsegmental branches; n = 8).

RESULTS:

Gamma-glutamyl transferase levels on admission, heart rate, oxygen saturation, right ventricular dilatation/hypokinesia, pulmonary artery systolic pressure and cardiopulmonary resuscitation requirement showed prognostic significance in univariate analysis. The multivariate logistic regression model showed that gamma-glutamyl transferase level on admission (odds ratio, OR = 1.044; 95% confidence interval, CI: 1.011-1.079; P = 0.009) and pulmonary artery systolic pressure (OR = 1.063; 95% CI: 1.005-1.124; P = 0.033) remained independently associated with proximally localized thrombus in pulmonary artery.

CONCLUSIONS:

The findings revealed a significant association between increased existing embolism load in the pulmonary artery and increased serum gamma-glutamyl transferase levels.

2. Int J Cardiol. 2015 Nov 18;203:1086-1092. doi: 10.1016/j.ijcard.2015.11.100. [Epub ahead of print]

Ambient air pollution and out-of-hospital cardiac arrest.

Kang SH1, Heo J2, Oh IY1, Kim J3, Lim WH4, Cho Y1, Choi EK5, Yi SM2, Do Shin S6, Kim H7, Oh S8.

Abstract

BACKGROUND:

Sudden cardiac arrest is a leading cause of cardiovascular death. This study aimed at investigating the impact of short-term exposure to air pollutants on the incidence of OHCA.

METHODS:

We identified OHCA cases that occurred in Seoul between 2006 and 2013 from the nationwide emergency medical service database. The association of the daily incidence of OHCA with air pollutants including PM2.5 (particles $\leq 2.5\mu\text{m}$ in aerodynamic diameter), PM10, CO, O3, NO2, and SO2 was analyzed with the use of time-series and case-crossover analyses.

RESULTS:

A total of 21,509 OHCA cases of presumed cardiac origin were identified. An elevation in PM2.5 by $10\mu\text{g}/\text{m}^3$ at a moving average of lag 1 and 2 days was shown to increase the risk of OHCA by 1.30% (95% confidence intervals, 0.20-2.41%). An exposure-response relationship was present: the risk of OHCA increased significantly with even a mild elevation of PM2.5 ($10\text{-}15\mu\text{g}/\text{m}^3$) and further increased with higher levels. While PM10, NO2, CO, and SO2 also showed significant associations with OHCA in single-pollutant models, only PM2.5 remained significant after adjustment for other pollutants. Subgroup analyses showed male sex, advanced age,

hypertension, diabetes, heart disease, and history of stroke were risk factors for OHCA in response to elevations in PM2.5.

CONCLUSIONS:

This study showed that increased ambient levels of PM2.5 were significantly associated with increased risk of OHCA within 1 to 2 days of exposure, which had a dose-response relationship. Subjects with conventional cardiovascular risk factors were more susceptible to harm of PM2.5.

3. Med Intensiva. 2015 Nov 29. pii: S0210-5691(15)00218-1. doi: 10.1016/j.medin.2015.10.004. [Epub ahead of print]

Knowledge and attitudes of citizens in the Basque Country (Spain) towards cardiopulmonary resuscitation and automatic external defibrillators.

[Article in English, Spanish]

Ballesteros-Peña S1, Fernández-Aedo I2, Pérez-Urdiales I2, García-Azpiazu Z2, Unanue-Arza S2.

Abstract

AIM:

To explore the training, ability and attitudes towards cardiopulmonary resuscitation and the use of automatic defibrillators among the population of the Basque Country (Spain).

DESIGN:

A face-to-face survey.

SCOPE:

Capital cities of the Basque Country.

PARTICIPANTS:

A total of 605 people between 15-64 years of age were randomly selected.

MAIN VARIABLES OF INTEREST:

Information about the knowledge, perceptions and self-perceived ability to identify and assist cardiopulmonary arrest was requested.

RESULTS:

A total of 56.4% of the responders were women, 61.8% were occupationally active, and 48.3% had higher education. Thirty-seven percent of the responders claimed to be trained in resuscitation techniques, but only 20.2% considered themselves able to apply such techniques. Public servants were almost 4 times more likely of being trained in defibrillation compared to the rest of workers (OR 3.7; $P < .001$), while people with elementary studies or no studies were almost 3 times more likely of not being trained in cardiopulmonary resuscitation, in comparison with the rest (OR 2.7; $P = .001$). A total of 94.7% of the responders considered it «quite or very important» for the general population to be able to apply resuscitation, though 55% considered themselves unable to identify an eye witnessed cardiac arrest, and 40.3% would not recognize a public-access defibrillator.

CONCLUSIONS:

Citizens of the Basque Country consider the early identification and treatment of cardiorespiratory arrest victims to be important, though their knowledge in cardiopulmonary resuscitation and defibrillation is limited.

ULL A AQUEST COCHRANE!!!

4. Cochrane Database Syst Rev. 2015 Dec 8;12:CD008093. [Epub ahead of print]

Amiodarone versus other pharmacological interventions for prevention of sudden cardiac death.

Claro JC1, Candia R, Rada G, Baraona F, Larrondo F, Letelier LM.

Abstract

BACKGROUND:

Sudden cardiac death (SCD) is one of the main causes of cardiac death. There are two main strategies to prevent it: managing cardiovascular risk factors and reducing the risk of ventricular arrhythmias. Implantable cardiac defibrillators (ICDs) constitute the standard therapy for both primary and secondary prevention; however, they are not widely available in settings with limited resources. The antiarrhythmic amiodarone has been proposed as an alternative to ICD.

OBJECTIVES:

To evaluate the effectiveness of amiodarone for primary or secondary prevention in SCD compared with placebo or no intervention or any other antiarrhythmic drugs in participants at high risk (primary prevention) or who have recovered from a cardiac arrest or a syncope due to Ventricular Tachycardia/Ventricular Fibrillation, or VT/VF (secondary prevention).

SEARCH METHODS:

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (OVID), EMBASE (OVID), CINAHL (EBSCO) and LILACS on 26 March 2015. We reviewed reference lists of included studies and selected reviews on the topic, contacted authors of included studies, screened relevant meetings and searched in registers for ongoing trials. We applied no language restrictions.

SELECTION CRITERIA:

Randomised and quasi-randomised trials assessing the efficacy of amiodarone versus placebo, no intervention, or other antiarrhythmics in adults. For primary prevention we considered participants at high risk for SCD. For secondary prevention we considered participants recovered from cardiac arrest or syncope due to ventricular arrhythmias.

DATA COLLECTION AND ANALYSIS:

Two authors independently assessed the trials for inclusion and extracted relevant data. We contacted trial authors for missing data. We performed meta-analyses using a random-effects model. We calculated risk ratios (RR) for dichotomous outcomes with 95% confidence intervals (CIs). Three studies included more than one comparison.

MAIN RESULTS:

We included 24 studies (9,997 participants). Seventeen studies evaluated amiodarone for primary prevention and six for secondary prevention. Only three studies used an ICD concomitantly with amiodarone for the comparison (all of them for secondary prevention). For primary prevention, amiodarone compared to placebo or no intervention (17 studies, 8383 participants) reduced SCD (RR 0.76; 95% CI 0.66 to 0.88), cardiac mortality (RR 0.86; 95% CI 0.77 to 0.96) and all-cause mortality (RR 0.88; 95% CI 0.78 to 1.00). The quality of the evidence was low. Compared to other antiarrhythmics (three studies, 540 participants), amiodarone reduced SCD (RR 0.44; 95% CI 0.19 to 1.00), cardiac mortality (RR 0.41; 95% CI 0.20 to 0.86) and all-cause mortality (RR 0.37; 95% CI 0.18 to 0.76). The quality of the evidence was moderate. For secondary prevention, amiodarone compared to placebo or no intervention (two studies, 440 participants) appeared to increase the risk of SCD (RR 4.32; 95% CI 0.87 to 21.49) and all-cause mortality (RR 3.05; 1.33 to 7.01). However, the quality of the evidence was very low. Compared to other antiarrhythmics (four studies, 839 participants) amiodarone appeared to increase the risk of SCD (RR 1.40; 95% CI 0.56 to 3.52; very low quality of evidence), but there was no effect in all-cause mortality (RR 1.03; 95% CI 0.75 to 1.42; low quality evidence). Amiodarone was associated with an increase in pulmonary and thyroid adverse events.

AUTHORS' CONCLUSIONS:

There is low to moderate quality evidence that amiodarone reduces SCD, cardiac and all-cause mortality when compared to placebo or no intervention for primary prevention, and its effects are superior to other antiarrhythmics. It is uncertain if amiodarone reduces or increases SCD and mortality for secondary prevention because the quality of the evidence was very low.

MONITORATGE

1. Nurs N Z. 2015 Oct;21(9):20-4.

Capnography: monitoring CO₂.

Casey G.

Abstract

MONITORING RESPIRATORY and metabolic function by using capnography to measure end tidal carbon dioxide is standard practice in anaesthesia. It is also becoming more common in intensive care units and during procedural sedation. End tidal carbon dioxide (EtCO₂) monitoring may also be used to assess effectiveness of cardiopulmonary resuscitation. Capnography is now emerging in general medical and surgical wards to monitor respiratory depression in patients using opioid analgesics. Using EtCO₂ to monitor respiratory function offers many benefits over pulse oximetry. It is important to understand the differences

between these two monitoring methods, and why capnography is increasingly favoured in many situations. An understanding of the physiological processes involved in CO₂ excretion allows nurses to use capnography in a safe and meaningful way, while monitoring at-risk patients in acute care.

TTM

1. Ther Hypothermia Temp Manag. 2015 Dec;5(4):184-7. doi: 10.1089/ther.2015.0027.

Variability in Postarrest Targeted Temperature Management Practice: Implications of the 2015 Guidelines.

Leary M^{1,2}, Blewer AL^{1,3}, Delfin G¹, Abella BS^{1,4}.

Abstract

In 2002 postarrest care was significantly altered when multiple randomized controlled trials found that therapeutic hypothermia at a goal temperature of 32-34°C significantly improved survival and neurologic outcomes. In 2013, targeted temperature management (TTM) was reexamined via a randomized controlled trial between 33°C and 36°C in post-cardiac arrest patients and found similar outcomes in both cohorts. Before the release of the 2015 American Heart Association (AHA) Guidelines, our group found that across hospitals in the United States, and even within the same institution, TTM protocol variability existed. After the 2013 TTM trial, it was anticipated that the 2015 Guidelines would clarify which target temperature should be used during postarrest care. The AHA released their updates for post-cardiac arrest TTM recently and, based on the literature available, have recommended the use of TTM at a goal temperature between 32°C and 36°C. Whether this variability has an effect on TTM implementation or patient outcomes is unknown

PEDIATRIA

1. Crit Care Med. 2015 Dec 7. [Epub ahead of print]

Incidence and Outcomes of Cardiopulmonary Resuscitation in PICUs.

Berg RA¹, Nadkarni VM, Clark AE, Moler F, Meert K, Harrison RE, Newth CJ, Sutton RM, Wessel DL, Berger JT, Carcillo J, Dalton H, Heidemann S, Shanley TP, Zuppa AF, Doctor A, Tamburro RF, Jenkins TL, Dean JM, Holubkov R, Pollack MM; Eunice Kennedy Shriver National Institute of Child Health and Human Development Collaborative Pediatric Critical Care Research Network.

Abstract

OBJECTIVES:

To determine the incidence of cardiopulmonary resuscitation in PICUs and subsequent outcomes.

DESIGN, SETTING, AND PATIENTS:

Multicenter prospective observational study of children younger than 18 years old randomly selected and intensively followed from PICU admission to hospital discharge in the Collaborative Pediatric Critical Care Research Network December 2011 to April 2013.

RESULTS:

Among 10,078 children enrolled, 139 (1.4%) received cardiopulmonary resuscitation for more than or equal to 1 minute and/or defibrillation. Of these children, 78% attained return of circulation, 45% survived to hospital discharge, and 89% of survivors had favorable neurologic outcomes. The relative incidence of cardiopulmonary resuscitation events was higher for cardiac patients compared with non-cardiac patients (3.4% vs 0.8%, $p < 0.001$), but survival rate to hospital discharge with favorable neurologic outcome was not statistically different (41% vs 39%, respectively). Shorter duration of cardiopulmonary resuscitation was associated with higher survival rates: 66% (29/44) survived to hospital discharge after 1-3 minutes of cardiopulmonary resuscitation versus 28% (9/32) after more than 30 minutes ($p < 0.001$). Among survivors, 90% (26/29) had a favorable neurologic outcome after 1-3 minutes versus 89% (8/9) after more than 30 minutes of cardiopulmonary resuscitation.

CONCLUSIONS:

These data establish that contemporary PICU cardiopulmonary resuscitation, including long durations of cardiopulmonary resuscitation, results in high rates of survival-to-hospital discharge (45%) and favorable neurologic outcomes among survivors (89%). Rates of survival

with favorable neurologic outcomes were similar among cardiac and noncardiac patients. The rigorous prospective, observational study design avoided the limitations of missing data and potential selection biases inherent in registry and administrative data.

2. Exp Ther Med. 2015 Nov;10(5):1624-1626. Epub 2015 Sep 22.

Brain hypothermia therapy for childhood acute encephalopathy based on clinical evidence.

Imataka G1, Arisaka O1.

Abstract

Although previous studies have reported on the effectiveness of brain hypothermia therapy in childhood acute encephalopathy, additional studies in this field are necessary. In this review, we discussed brain hypothermia therapy methods for two clinical conditions for which sufficient evidences are currently available in the literature. The first condition is known as hypoxic-ischemic encephalopathy and occurs in newborns and the second condition is acute encephalopathy which occurs in adults following cardiopulmonary resuscitation associated with out-of-hospital cardiac arrest state resulting from ventricular arrhythmia. Furthermore, we assessed the prospects of applying these therapies to acute encephalopathy in children.

3. Anesth Prog. 2015 Winter;62(4):162-165.

Pulseless Ventricular Tachycardia During Office-Based Anesthetic in a Four-Year-Old Child.

Orr TM1, Orr DL 2nd2.

Abstract

A 4-year-old 16-kg boy presented for full mouth dental rehabilitation in a private pediatric dental office. The patient had no significant previous medical history. Upon sevoflurane induction by a dentist anesthesiologist, the patient converted from normal sinus rhythm to pulseless ventricular tachycardia. Advanced cardiac life support protocol was initiated. After 2 automatic external defibrillator shocks were delivered in conjunction with epinephrine administration, the patient returned to normal sinus rhythm. The patient was transported via emergency medical service paramedics to a local children's hospital emergency room where he was observed uneventfully for 24 hours prior to discharge.

REGISTRES I REVISIONS

1. J Cardiol. 2015 Nov 25. pii: S0914-5087(15)00266-X. doi: 10.1016/j.jjcc.2015.08.009. [Epub ahead of print]

Brugada syndrome: More than 20 years of scientific excitement.

Brugada P1.

Abstract

In 1992 we reported on eight patients with a particular electrocardiograph (ECG) showing ST segment elevation in the right precordial leads. All patients had a structurally normal heart and had survived one or multiple episodes of near sudden death caused by ventricular fibrillation. We showed 6 years later that this disease, known nowadays as Brugada syndrome, was caused by mutations in the SCN5A gene which encodes for the cardiac sodium channel. Other genes where mutations result in the same ECG have been also identified, with at present more than 17 different genes published. These data show that Brugada syndrome is a genetically heterogeneous disease as is also the case in the long QT syndrome. In Brugada syndrome, the clue to the initial clinical diagnosis remains the abnormal ECG. However, it was evident from the beginning that the ECG of Brugada syndrome is variable and sensitive to many autonomic, drug, exercise, emotions and other external influences such as a meal, fever, changes in heart rate from any cause, and even body position. When followed intensively, all patients with a Brugada ECG will show a completely normal ECG at one or another moment in their lives. The spontaneous normalization of the ECG represents a major diagnostic challenge, because a patient with Brugada syndrome seen during normalization of the ECG may fail to get the correct diagnosis. In these more than 20 years great challenges have been overcome but some remain, mainly the approach to the asymptomatic individual with a diagnosis of Brugada syndrome. In 30-50% of individuals who die suddenly because of documented or suspected

Brugada syndrome, sudden death is the first manifestation of the disease. Thus, these individuals were fully asymptomatic until the first fatal event.

RCP MECÀNICA

1. J Thorac Dis. 2015 Oct;7(10):E459-E467.

Cardiopulmonary resuscitation using electrically driven devices: a review.

Prinzing A1, Eichhorn S1, Deutsch MA1, Lange R1, Krane M1.

Abstract

In the treatment of sudden cardiac arrest (SCA) immediate resuscitation with chest compressions and ventilation is crucial for survival. As manual resuscitation is associated with several drawbacks, mechanical resuscitation devices have been developed to support resuscitation teams. These devices are able to achieve better perfusion of heart and brain in laboratory settings, but real world experience showed no significant improved survival in comparison to manual resuscitation. This review will focus on two mechanical resuscitation devices, the Lund University Cardiac Assist System (LUCAS) and AutoPulse devices and the actual literature available. In conclusion, the general use of mechanical resuscitation devices cannot be recommended at the moment.

TRAUMA

1. Resuscitation. 2015 Nov 24. pii: S0300-9572(15)00879-5. doi: 10.1016/j.resuscitation.2015.10.015. [Epub ahead of print]

Trends in traumatic out-of-hospital cardiac arrest in Perth, Western Australia from 1997 to 2014.

Beck B1, Tohira H2, Bray JE3, Straney L4, Brown E5, Inoue M2, Williams T5, McKenzie N2, Celenza A6, Bailey P5, Finn J7.

Abstract

AIM:

This study aims to describe and compare traumatic and medical out-of-hospital cardiac arrest (OHCA) occurring in Perth, Western Australia, between 1997 and 2014.

METHODS:

The St John Ambulance Western Australia (SJA-WA) OHCA Database was used to identify all adult (≥ 16 years) cases. We calculated annual crude and age-sex standardised incidence rates (ASIRs) for traumatic and medical OHCA and investigated trends over time.

RESULTS:

Over the study period, SJA-WA attended 1,354 traumatic OHCA and 16,076 medical OHCA cases. The mean annual crude incidence rate of traumatic OHCA in adults attended by SJA-WA was 6.0 per 100,000 (73.9 per 100,000 for medical cases), with the majority resulting from motor vehicle collisions (56.7%). We noted no change to either incidence or mechanism of injury over the study period ($p > 0.05$). Compared to medical OHCA, traumatic OHCA cases were less likely to receive bystander cardiopulmonary resuscitation (CPR) (20.4% vs. 24.5%, $p = 0.001$) or have resuscitation commenced by paramedics (38.9% vs. 44.8%, $p < 0.001$). However, rates of bystander CPR and resuscitation commenced by paramedics increased significantly over time in traumatic OHCA ($p < 0.001$). In cases where resuscitation was commenced by paramedics there was no difference in the proportion who died at the scene (37.2% traumatic vs. 34.3% medical, $p = 0.17$), however, fewer traumatic OHCA survived to hospital discharge (1.7% vs. 8.7%, $p < 0.001$).

CONCLUSIONS:

Despite temporal increases in rates of bystander CPR and paramedic resuscitation, traumatic OHCA survival remains poor with only nine patients surviving from traumatic OHCA over the 18-year period.

DEAs

1. Am Heart Assoc. 2015 Dec 1;4(12). pii: e002465. doi: 10.1161/JAHA.115.002465.

Diagnostic Accuracy of Commercially Available Automated External Defibrillators.

Nishiyama T1, Nishiyama A2, Negishi M2, Kashimura S1, Katsumata Y1, Kimura T1, Nishiyama N1, Tanimoto Y1, Aizawa Y1, Mitamura H3, Fukuda K1, Takatsuki S1.

Abstract

BACKGROUND:

Although automated external defibrillators (AEDs) have contributed to a better survival of out-of-hospital cardiac arrests, there have been reports of their malfunctioning. We investigated the diagnostic accuracy of commercially available AEDs using surface ECGs of ventricular fibrillation (VF), ventricular tachycardia (VT), and supraventricular tachycardia (SVT).

METHODS AND RESULTS:

ECGs (VF 31, VT 48, SVT 97) were stored during electrophysiological studies and transmitted to 4 AEDs, the LifePak CR Plus (CR Plus), HeartStart FR3 (FR3), and CardioLife AED-2150 (CL2150) and -9231 (CL9231), through the pad electrode cables. For VF, the CL2150 and CL9231 advised shocks in all cases, and the CR Plus and FR3 advised shocks in all but one VF case. For VTs faster than 180 bpm, the ratios for advising shocks were 79%, 36%, 89%, and 96% for the CR Plus, FR3, CL2150, and CL9231, respectively. The FR3 and CR Plus did not advise shocks for narrow QRS SVTs, whereas the CL9231 tended to treat high-rate tachycardias faster than 180 bpm even with narrow QRS complexes. The characteristics of the shock advice for the FR3 differed from that for the CL9231 (kappa coefficient [κ]=0.479, $P<0.001$), and the CR Plus and CL2150 had characteristics somewhere between the 2 former AEDs ($\kappa=0.818$, $P<0.001$).

CONCLUSIONS:

Commercially available AEDs diagnosed VF almost always correctly. For VT and SVT diagnoses, a discrepancy was evident among the 4 investigated AEDs. The differences in the arrhythmia diagnosis algorithms for differentiating SVT from VT were thought to account for these differences.

TTM

1. *Circulation*. 2015 Dec 1;132(22):2146-51. doi: 10.1161/CIRCULATIONAHA.115.016317. Epub 2015 Nov 16.

The Utility of Therapeutic Hypothermia for Post-Cardiac Arrest Syndrome Patients With an Initial Nonshockable Rhythm.

Perman SM1, Grossestreuer AV2, Wiebe DJ2, Carr BG2, Abella BS2, Galeski DF2.

Abstract

BACKGROUND:

Therapeutic hypothermia (TH) attenuates reperfusion injury in comatose survivors of cardiac arrest. The utility of TH in patients with nonshockable initial rhythms has not been widely accepted. We sought to determine whether TH improved neurological outcome and survival in postarrest patients with nonshockable rhythms.

METHODS AND RESULTS:

We identified 519 patients after in- and out-of-hospital cardiac arrest with nonshockable initial rhythms from the Penn Alliance for Therapeutic Hypothermia (PATH) registry between 2000 and 2013. Propensity score matching was used. Patient and arrest characteristics used to estimate the propensity to receive TH were age, sex, location of arrest, witnessed arrest, and duration of arrest. To determine the association between TH and outcomes, we created 2 multivariable logistic models controlling for confounders. Of 201 propensity score-matched pairs, mean age was 63 ± 17 years, 51% were male, and 60% had an initial rhythm of pulseless electric activity. Survival to hospital discharge was greater in patients who received TH (17.6% versus 28.9%; $P<0.01$), as was a discharge Cerebral Performance Category of 1 to 2 (13.7% versus 21.4%; $P=0.04$). In adjusted analyses, patients who received TH were more likely to survive (odds ratio, 2.8; 95% confidence interval, 1.6-4.7) and to have better neurological outcome (odds ratio, 3.5; 95% confidence interval, 1.8-6.6) than those that did not receive TH.

CONCLUSIONS:

Using propensity score matching, we found that patients with nonshockable initial rhythms treated with TH had better survival and neurological outcome at hospital discharge than those who did not receive TH. Our findings further support the use of TH in patients with initial nonshockable arrest rhythms.

2. *Medicine (Baltimore)*. 2015 Nov;94(47):e2152. doi: 10.1097/MD.0000000000002152.

Therapeutic Hypothermia and the Risk of Hemorrhage: A Systematic Review and Meta-Analysis of Randomized Controlled Trials.

Wang CH1, Chen NC, Tsai MS, Yu PH, Wang AY, Chang WT, Huang CH, Chen WJ.

Abstract

Current guidelines recommend a period of moderate therapeutic hypothermia (TH) for comatose patients after cardiac arrest to improve clinical outcomes. However, in-vitro studies have reported platelet dysfunction, thrombocytopenia, and coagulopathy, results that might discourage clinicians from applying TH in clinical practice. We aimed to quantify the risks of hemorrhage observed in clinical studies. Medline and Embase were searched from inception to October 2015. Randomized controlled trials (RCTs) comparing patients undergoing TH with controls were selected, irrespective of the indications for TH. There were no restrictions for language, population, or publication year. Data on study characteristics, which included patients, details of intervention, and outcome measures, were extracted. Forty-three trials that included 7528 patients were identified from 2692 potentially relevant references. Any hemorrhage was designated as the primary outcome and was reported in 28 studies. The pooled results showed no significant increase in hemorrhage risk associated with TH (risk difference [RD] 0.005; 95% confidence interval [CI] -0.001-0.011; I, 0%). Among secondary outcomes, patients undergoing TH were found to have increased risk of thrombocytopenia (RD 0.109; 95% CI 0.038-0.179; I 57.3%) and transfusion requirements (RD 0.021; 95% CI 0.003-0.040; I 0%). The meta-regression analysis indicated that prolonged duration of cooling may be associated with increased risk of hemorrhage. TH was not associated with increased risk of hemorrhage despite the increased risk of thrombocytopenia and transfusion requirements. Clinicians should cautiously assess each patient's risk-benefit profile before applying TH.

3. *BMC Health Serv Res*. 2015 Dec 2;15(1):533. doi: 10.1186/s12913-015-1199-z.

Prehospital transportation to therapeutic hypothermia centers and survival from out-of-hospital cardiac arrest.

DeLia D1, Wang HE2, Kutzin J3, Merlin M4, Nova J5, Lloyd K6, Cantor JC7.

Abstract

BACKGROUND:

Clinical trials supporting the use of therapeutic hypothermia (TH) in the treatment of out-of-hospital cardiac arrest (OHCA) are based on small patient samples and do not reflect the wide variation in patient selection, cooling methods, and other elements of post-arrest care that are used in everyday practice. This study provides a real world evaluation of the effectiveness of post-arrest care in TH centers during a time of growing TH dissemination in the state of New Jersey (NJ).

METHODS:

Using a linked database of prehospital, hospital, and mortality records for NJ in 2009-2010, we compared rates of neurologically intact survival at discharge and at 30 days for OHCA patients transported to TH centers (N = 2363) versus other hospitals (N = 2479). We used logistic regression to adjust for patient and hospital covariates. To account for potential endogeneity in prehospital transportation decisions, we used an instrumental variable (IV) based on differential distance to the nearest TH and non-TH hospitals.

RESULTS:

Patients taken to TH centers were older, more likely to have a witnessed arrest, more likely to receive defibrillation, and waited a shorter amount of time for initial EMS response. Also, TH hospitals were larger, more likely to be teaching facilities, and operated in a service area with a relatively lower poverty rate compared to hospitals statewide. A Stock-Yogo test confirmed the strength of our IV (F = 2349.91, p < 0.0001). Nevertheless, the data showed no evidence of endogenous transportation to TH centers related to in-hospital survival (Z = -0.08, p = 0.934) or 30-day survival (Z = 0.94, p = 0.349). In logistic regression models, treatment at a TH center was associated with greater odds of 30-day neurologically intact survival (OR = 1.70; 95% CI: 1.19 - 2.42) but not associated with the odds of neurologically intact survival to hospital discharge (OR = 0.90; 95% CI: 0.61 - 1.31).

CONCLUSIONS:

Post-arrest outcomes are more favorable at TH centers but these improved outcomes are not apparent until after hospital discharge. This finding may reflect superior care by TH centers in later stages of post-arrest treatment such as care provided in the intensive care unit, which has greater potential to affect longer term outcomes than initial treatment in the emergency department.

4. Crit Care. 2015 Dec 1;19:417. doi: 10.1186/s13054-015-1133-0.

The effect of mild induced hypothermia on outcomes of patients after cardiac arrest: a systematic review and meta-analysis of randomised controlled trials.

Zhang XW1, Xie JF2, Chen JX3, Huang YZ4, Guo FM5, Yang Y6, Qiu HB7.

Abstract

INTRODUCTION:

Mild induced hypothermia (MIH) is believed to reduce mortality and neurological impairment after out-of-hospital cardiac arrest. However, a recently published trial demonstrated that hypothermia at 33 °C did not confer a benefit compared with that of 36 °C. Thus, a systematic review and meta-analysis of randomised controlled trials (RCTs) was made to investigate the impact of MIH compared to controls on the outcomes of adult patients after cardiac arrest.

METHODS:

We searched the following electronic databases: PubMed/MEDLINE, the Cochrane Library, Embase, the Web of Science, and Elsevier Science (inception to December 2014). RCTs that compared MIH with controls with temperature >34 °C in adult patients after cardiac arrest were retrieved. Two investigators independently selected RCTs and completed an assessment of the quality of the studies. Data were analysed by the methods recommended by the Cochrane Collaboration. Random errors were evaluated with trial sequential analysis.

RESULTS:

Six RCTs, including one abstract, were included. The meta-analysis of included trials revealed that MIH did not significantly decrease the mortality at hospital discharge (risk ratio (RR) = 0.92; 95 % confidence interval (CI), 0.82-1.04; p = 0.17) or at 6 months or 180 days (RR = 0.94; 95 % CI, 0.73-1.21; p = 0.64), but it did reduce the mortality of patients with shockable rhythms at hospital discharge (RR = 0.74; 95 % CI, 0.59-0.92; p = 0.008) and at 6 months or 180 days. However, MIH can improve the outcome of neurological function at hospital discharge (RR = 0.80; 95 % CI, 0.64-0.98; p = 0.04) especially in those patients with shockable rhythm but not at 6 months or 180 days. Moreover, the incidence of complications in the MIH group was significantly higher than that in the control group. Finally, trial sequential analysis indicated lack of firm evidence for a beneficial effect.

CONCLUSION:

The available RCTs suggest that MIH does not appear to improve the mortality of patients with cardiac arrest while it may have a beneficial effect for patients with shockable rhythms. Although MIH may result in some adverse events, it helped lead to better outcomes regarding neurological function at hospital discharge. Large-scale ongoing trials may provide data better applicable to clinical practice.

5. Bosn J Basic Med Sci. 2015 Nov 12;15(4):60-3. doi: 10.17305/bjbms.2015.565.

Optimization of induction of mild therapeutic hypothermia with cold saline infusion: A laboratory experiment.

Fluher J1, Markota A, Stožer A, Sinkovič A.

Abstract

Cold fluid infusions can be used to induce mild therapeutic hypothermia after cardiac arrest. Fluid temperature higher than 4°C can increase the volume of fluid needed, prolong the induction phase of hypothermia and thus contribute to complications. We performed a laboratory experiment with two objectives. The first objective was to analyze the effect of wrapping fluid bags in ice packs on the increase of fluid temperature with time in bags exposed to ambient conditions. The second objective was to quantify the effect of insulating venous tubing and adjusting flow rate on fluid temperature increase from bag to the level of an

intravenous cannula during a simulated infusion. The temperature of fluid in bags wrapped in ice packs was significantly lower compared to controls at all time points during the 120 minutes observation. The temperature increase from the bag to the level of intravenous cannula was significantly lower for insulated tubing at all infusion rates (median temperature differences between bag and intravenous cannula were: 8.9, 4.8, 4.0, and 3.1°C, for non-insulated and 5.9, 3.05, 1.1, and 0.3°C, for insulated tubing, at infusion rates 10, 30, 60, and 100 mL/minute, respectively). The results from this study could potentially be used to decrease the volume of fluid infused when inducing mild hypothermia with an infusion of cold fluids.

PEDIATRIA

1. Circulation. 2015 Dec 3. pii: CIRCULATIONAHA.115.016082. [Epub ahead of print]

Extracorporeal-Cardiopulmonary Resuscitation (E-CPR) During Pediatric In-Hospital Cardiopulmonary Arrest is Associated with Improved Survival to Discharge: A Report from the American Heart Association's Get With the Guidelines® - Resuscitation Registry (GWTG-R).

Lasa JJ1, Rogers RS2, Localio R2, Shults J2, Raymond T3, Gaies M4, Thiagarajan R5, Laussen PC6, Kilbaugh T2, Berg RA2, Nadkarni V2, Topjian A2.

Abstract

BACKGROUND:

-Although extracorporeal CPR (E-CPR) can result in survival after failed conventional CPR (C-CPR), no large, systematic comparison of pediatric E-CPR versus continued C-CPR has been reported.

METHODS AND RESULTS:

-Consecutive patients <18 years old with CPR events \geq 10 minutes duration reported to GWTG-R between January 2000 and December 2011 were identified. Hospitals were grouped by teaching status and location. Primary outcome was survival to discharge. Regression modeling was performed conditioning on hospital groups. A secondary analysis was performed using propensity-score matching. Of 3,756 evaluable patients, 591 (16%) received E-CPR and 3,165 (84%) received C-CPR only. Survival to hospital discharge and survival with favorable neurologic outcome (Pediatric Cerebral Performance Category score of 1-3 or unchanged from admission) were greater for E-CPR [40% (237/591) and 27% (133/496)] versus C-CPR patients [27% (862/3,165) and 18% (512/2,840)]. Odds ratios for survival to hospital discharge and survival with favorable neurologic outcome were greater for E-CPR versus C-CPR. After adjusting for covariates, patients receiving E-CPR had higher odds of survival to discharge [OR 2.80, 95% CI 2.13-3.69, $p < 0.001$] and survival with favorable neurologic outcome [OR 2.64, 95% CI 1.91-3.64, $p < 0.001$] than patient who received C-CPR. This association persisted when analyzed by propensity-score matched cohorts [OR 1.70, 95% CI 1.33-2.18, $p < 0.001$ and OR 1.78, 95% CI 1.31-2.41, $p < 0.001$ respectively].

CONCLUSIONS:

-For children with in-hospital CPR \geq 10 minutes duration, E-CPR was associated with improved survival to hospital discharge and survival with favorable neurologic outcome when compared to C-CPR.

2. Eur J Emerg Med. 2015 Nov 27. [Epub ahead of print]

Out-of-hospital cardiopulmonary resuscitation strategies using one-handed chest compression technique for children suffering a cardiac arrest.

Jung GH1, Oh JH, Kim CW, Kim SE, Lee DH.

Abstract

OBJECTIVE:

We evaluated the decrease in chest compression depth during 30:2 compression-to-ventilation ratio one-handed chest compression (OHCC) in an out-of-hospital pediatric arrest setting, and whether switching hands every other cycle could maintain compression depth.

METHODS:

A 5-year-old child-sized manikin was used, and 50 medical students participated in the present study. First, the participants performed 5 min OHCC with a 30:2 compression-to-ventilation

ratio on the floor (baseline test). Second, the compression technique was changed from the OHCC to the two-handed chest compression when they became subjectively fatigued (test 1). Third, the compression hand was alternated every other cycle (test 2). Average compression depth (ACD) data were recorded using an accelerometer device.

RESULTS:

ACD changed significantly during the baseline test (0-1 min: 44.5±5.3 mm, 1-2 min: 43.7±6.1 mm, 2-3 min: 43.4±6.5 mm, 3-4 min: 43.2±6.5 mm, and 4-5 min: 42.3±6.5 mm, P=0.012). However, no significant differences were observed during test 1 or test 2. The baseline ACD value for the 4-5-min interval [95% confidence interval (CI), 40.5-44.2 mm] was significantly lower than those in test 1 (95% CI, 43.0-45.9 mm, P=0.004) and test 2 (95% CI, 42.4-45.9 mm, P=0.004). No differences in the ACDs at any interval were observed between test 1 and test 2.

CONCLUSION:

Compression depth decreased significantly after 4 min during 30 : 2 ratio OHCC. However, it was maintained by changing from the OHCC to the two-handed chest compression or by alternating compression hands every other cycle.

3. Arch Dis Child Fetal Neonatal Ed. 2015 Dec 1. pii: fetalneonatal-2015-309761. doi: 10.1136/archdischild-2015-309761. [Epub ahead of print]

A review of approaches to optimise chest compressions in the resuscitation of asphyxiated newborns.

Solevåg AL1, Cheung PY2, O'Reilly M2, Schmölzer GM2.

Provision of chest compressions (CCs) and/or medications in the delivery room is associated with poor outcomes. Based on the physiology of perinatal asphyxia, we aimed to provide an overview of current recommendations and explore potential determinants of effective neonatal cardiopulmonary resuscitation (CPR): balancing ventilations and CC, CC rate, depth, full chest recoil, CC technique and adrenaline.

DESIGN:

A search in the databases MEDLINE (Ovid) and EMBASE until 10 April 2015.

SETTING:

Delivery room.

PATIENTS:

Asphyxiated newborn infants.

INTERVENTIONS:

CCs.

MAIN OUTCOME MEASURES:

Haemodynamics, recovery and survival.

RESULTS:

Current evidence is derived from mathematical models, manikin and animal studies, and small case series. No randomised clinical trials examining neonatal CC have been performed. There is no evidence to refute a CC to ventilation (C:V) ratio of 3:1. Raising the intrathoracic pressure, for example, by superimposing a sustained inflation on uninterrupted CC, and a CC rate >120/min may be beneficial. The optimal neonatal CC depth is unknown, but factors influencing depth and consistency include the C:V ratio. Incomplete chest wall recoil can cause less negative intrathoracic pressure between CC and reduced CPR effectiveness. CC should be performed with the two-thumb method over the lower third of the sternum. The optimal dose, route and timing of adrenaline administration remain to be determined.

CONCLUSIONS:

Successful CPR requires the delivery of high-quality CC, encompassing optimal (A) C:V ratio (B) rate, (C) depth, (D) chest recoil between CC, (E) technique and (F) adrenaline dosage. More animal studies with high translational value and randomised clinical trials are needed.

POST ROSC

1. J Clin Neurophysiol. 2015 Dec;32(6):465-71. doi: 10.1097/WNP.000000000000199.

EEG as an Indicator of Cerebral Functioning in Postanoxic Coma.

Juan E1, Kaplan PW, Oddo M, Rossetti AO.

Abstract

Postanoxic coma after cardiac arrest is one of the most serious acute cerebral conditions and a frequent cause of admission to critical care units. Given substantial improvement of outcome over the recent years, a reliable and timely assessment of clinical evolution and prognosis is essential in this context, but may be challenging. In addition to the classic neurologic examination, EEG is increasingly emerging as an important tool to assess cerebral functions noninvasively. Although targeted temperature management and related sedation may delay clinical assessment, EEG provides accurate prognostic information in the early phase of coma. Here, the most frequently encountered EEG patterns in postanoxic coma are summarized and their relations with outcome prediction are discussed. This article also addresses the influence of targeted temperature management on brain signals and the implication of the evolution of EEG patterns over time. Finally, the article ends with a view of the future prospects for EEG in postanoxic management and prognostication.

2. Eur Heart J Acute Cardiovasc Care. 2015 Nov 30. pii: 2048872615620904. [Epub ahead of print]

Progress in the chain of survival and its impact on outcomes of patients admitted to a specialized high-volume cardiac arrest center during the past two decades.

Sulzgruber P1, Sterz F2, Schober A1, Uray T1, Van Tulder R1, Hubner P1, Wallmüller C1, El-Tattan D1, Graf N1, Ruzicka G1, Schriefl C1, Zajicek A3, Buchinger A3, Koller L4, Laggner AN1, Spiel A1.

Abstract

AIM:

Cardiac arrest (CA) is still associated with high mortality and morbidity. Data on the changes in management and outcomes over a long period of time are limited. Using data from a single emergency department (ED), we assessed changes over two decades.

METHODS:

In this single-center observational study, we prospectively included 4133 patients receiving cardiopulmonary resuscitation and being admitted to the ED of a tertiary care hospital between January 1992 and December 2012.

RESULTS:

There was a significant improvement in both 6-month survival rates (+10.8%; $p < 0.001$) and favorable neurological outcome (+4.7%; $p < 0.001$). While the number of witnessed CA cases decreased (-4.7%; $p < 0.001$) the proportion of patients receiving bystander basic life support increased (+8.3%; $p < 0.001$). The proportion of patients with initially shockable ECG rhythms remained unchanged, but cardiovascular causes of CA decreased (-9.6%; $p < 0.001$). Interestingly, the time from CA until ED admission increased (+0.1 hours; $p = 0.024$). The use of percutaneous coronary intervention and therapeutic hypothermia were significantly associated with survival.

CONCLUSIONS:

Outcomes of patients with CA treated at a specialized ED have improved significantly within the last 20 years. Improvements in every link in the chain of survival were noted.

ECOGRAFIA

1. Semin Intervent Radiol. 2015 Dec;32(4):384-387.

Endovascular Management of Acute Pulmonary Embolism Using the Ultrasound-Enhanced EkoSonic System.

Garcia MJ1.

Abstract

Acute, symptomatic pulmonary embolism (PE) in the massive and submassive categories continues to be a healthcare concern with significant risk for increased morbidity and mortality. Despite increased awareness and venous thromboembolism prophylaxis, endovascular treatment is still an important option for many of these patients. There are a variety of techniques and devices used for treating PE, but none have been evaluated as extensively as the EkoSonic endovascular system that is also currently the only FDA-approved

device for the treatment of pulmonary embolism. This article describes the use of the EkoSonic device for this patient population.

CASE REPORTS

1. Korean J Anesthesiol. 2015 Dec;68(6):617-621. Epub 2015 Nov 25.

Management of cardiac arrest in a parturient with Eisenmenger's syndrome and complete atrioventricular block during Cesarean section: a case report.

Kim GS1, Yang M1, Chang CH1, Lee EK1, Choi JY1.

Abstract

A 26-year-old parturient with Eisenmenger's syndrome and complete atrioventricular block was presented for emergency Cesarean section due to preterm labor. Ventricular tachycardia (VT), which progressed to ventricular fibrillation (VF), started immediately after the incision. Cardiopulmonary resuscitation with electric shocks was given by anesthesiologists while the obstetrician delivered the baby between the shocks. A cardiac surgeon was ready for extracorporeal membrane oxygenation institution in case of emergency but spontaneous circulation of the patient returned after the 3rd shock and the delivery of the baby. The newborn's Apgar score was 4 at 1 minute and 8 at 5 minutes. An implantable cardioverter-defibrillator was inserted before the discharge because the patient had recurrent episodes of VT and VF postoperatively.

2. Rev Port Cardiol. 2015 Nov 26. pii: S0870-2551(15)00311-X. doi: 10.1016/j.repc.2015.03.030. [Epub ahead of print]

An unusual case of fulminant myocarditis closely mimicking ST-segment elevation myocardial infarction and presenting as refractory cardiogenic shock complicated by multiple life-threatening arrhythmias.

[Article in English, Portuguese]

Wang ZQ1, Li YG2.

Abstract

We report a case of severe fulminant myocarditis that closely mimicked acute inferior ST-segment elevation myocardial infarction (STEMI) and presented with refractory cardiogenic shock, multiple life-threatening arrhythmias and rapidly progressive liver failure. This case was successfully differentiated from STEMI by emergency coronary angiography. Recurrent cardiogenic shock was reversed by intra-aortic balloon pumping (IABP). Life-threatening arrhythmias including ventricular tachycardia, ventricular fibrillation, and high-degree atrioventricular block (AVB) were terminated by immediate cardioversion and temporary pacemaker. High-dose hydrocortisone effectively attenuated the inflammatory injury to the myocardium. The patient recovered and was well at the follow-up visit four months after discharge.

REGISTRES I REVISIONS

Les conclusions d'aquest semblen òbvies.

1. Am J Hosp Palliat Care. 2015 Nov 20. pii: 1049909115617934. [Epub ahead of print]

Outcomes of In-Hospital Cardiopulmonary Resuscitation Among Patients With Cancer: Experience From Pakistan.

Zafar W1, Ghafoor I2, Jamshed A3, Gul S2, Hafeez H2.

Abstract

OBJECTIVE:

To review all episodes where an emergency code was called in a cancer-specialized hospital in Pakistan and to assess survival to discharge among patients who received a cardiopulmonary resuscitation (CPR).

METHODS:

We reviewed demographic and clinical data related to all "code blue" calls over 3 years. Multivariate logistic regression analyses were used to test the association of clinical characteristics with the primary outcome of survival to discharge.

RESULTS:

A total of 646 code blue calls were included in the analysis. The CPR was performed in 388 (60%) of these calls. For every 20 episodes of CPR among patients with cancer of all ages, only 1 resulted in a patient's survival to discharge, even though in 52.2% episodes there was a return of spontaneous circulation. No association was found between the type of rhythm at initiation of CPR and likelihood of survival to discharge.

CONCLUSIONS:

The proportion of patients with advanced cancer surviving to discharge after in-hospital CPR in a low-income country was in line with the reported international experience. Most patients with cancer who received in-hospital CPR did not survive to discharge and did not appear to benefit from resuscitation. Advance directives by patients with cancer limiting aggressive interventions at end of life and proper documentation of these directives will help in provision of care that is humane and consonant with patients' wishes for a dignified death. Patients' early appreciation of the limited benefits of CPR in advanced cancer is likely to help them formulate such advance directives.

RCP MECÀNICA

No sortirà que millori la supervivència, però està clar que va millor. I qui no s'ho cregui, que vingui a fer una ACR amb mi (i amb el meu amic LUCAS)

1. J Emerg Med. 2015 Nov 19. pii: S0736-4679(15)01050-1. doi: 10.1016/j.jemermed.2015.10.002. [Epub ahead of print]

Manual versus Mechanical Chest Compressions on Surfaces of Varying Softness with or without Backboards: A Randomized, Crossover Manikin Study.

Putzer G1, Fiala A1, Braun P1, Neururer S2, Biechl K1, Keilig B1, Ploner W3, Fop E3, Paal P1.

Abstract

BACKGROUND:

Chest compression quality is decisive for overall outcome after cardiac arrest. Chest compression depth may decrease when cardiopulmonary resuscitation (CPR) is performed on a mattress, and the use of a backboard does not necessarily improve compression depth. Mechanical chest compression devices may overcome this problem.

OBJECTIVES:

We sought to investigate the effectiveness of manual chest compressions both with and without a backboard compared to mechanical CPR performed on surfaces of different softness.

METHODS:

Twenty-four advanced life support (ALS)-certified rescuers were enrolled. LUCAS2 (Physio-Control, Redmond, WA) delivers 52 ± 2 mm deep chest compressions and active decompressions back to the neutral position (frequency 102 min⁻¹; duty cycle, 50%). This simulated CPR scenario was performed on a Resusci-Anne manikin (Laerdal, Stavanger, Norway) that was lying on 3 different surfaces: 1) a concrete floor, 2) a firm standard mattress, and 3) a pressure-relieving mattress. Data were recorded by the Laerdal Skill Reporting System.

RESULTS:

Manual chest compression with or without a backboard were performed correctly less often than mechanical chest compressions (floor: 33% [interquartile range {IQR}, 27-48%] vs. 90% [IQR, 86-94%], $p < 0.001$; standard mattress: 32% [IQR, 20-45%] vs. 27% [IQR, 14-46%] vs. 91% [IQR, 51-94%], $p < 0.001$; and pressure-relieving mattress 29% [IQR, 17-49%] vs. 30% [IQR, 17-52%] vs. 91% [IQR, 87-95%], $p < 0.001$). The mean compression depth on both mattresses was deeper with mechanical chest compressions (floor: 53 mm [range, 47-57 mm] vs. 56 mm [range, 54-57 mm], $p = 0.003$; standard mattress: 50 mm [range, 44-55 mm] vs. 51 mm [range, 47-55 mm] vs. 55 mm [range, 54-58 mm], $p < 0.001$; and pressure-relieving mattress: 49 mm

[range, 44-55 mm] vs. 50 mm [range, 44-53 mm] vs. 55 mm [range, 55-56 mm], $p < 0.001$). In this ~6-min scenario, the mean hands-off time was ~15 to 20 s shorter in the manual CPR scenarios.

CONCLUSIONS:

In this experimental study, only ~30% of manual chest compressions were performed correctly compared to ~90% of mechanical chest compressions, regardless of the underlying surface. Backboard use did not influence the mean compression depth during manual CPR. Chest compressions were deeper with mechanical CPR. The mean hands-off time was shorter with manual CPR.

Una meta-anàlisi sobre lo d'abans...

2. Ann Emerg Med. 2015 Nov 19. pii: S0196-0644(15)01311-6. doi: 10.1016/j.annemergmed.2015.09.023. [Epub ahead of print]

Manual Cardiopulmonary Resuscitation Versus CPR Including a Mechanical Chest Compression Device in Out-of-Hospital Cardiac Arrest: A Comprehensive Meta-analysis From Randomized and Observational Studies.

Bonnes JL1, Brouwer MA2, Navarese EP3, Verhaert DV2, Verheugt FW2, Smeets JL2, de Boer MJ2.

Abstract

STUDY OBJECTIVE:

Mechanical chest compression devices have been developed to facilitate continuous delivery of high-quality cardiopulmonary resuscitation (CPR). Despite promising hemodynamic data, evidence on clinical outcomes remains inconclusive. With the completion of 3 randomized controlled trials, we conduct a meta-analysis on the effect of in-field mechanical versus manual CPR on clinical outcomes after out-of-hospital cardiac arrest.

METHODS:

With a systematic search (PubMed, Web of Science, EMBASE, and the Cochrane Libraries), we identified all eligible studies (randomized controlled trials and nonrandomized studies) that compared a CPR strategy including an automated mechanical chest compression device with a strategy of manual CPR only. Outcome variables were survival to hospital admission, survival to discharge, and favorable neurologic outcome.

RESULTS:

Twenty studies ($n=21,363$) were analyzed: 5 randomized controlled trials and 15 nonrandomized studies, pooled separately. For survival to admission, the pooled estimate of the randomized controlled trials did not indicate a difference (odds ratio 0.94; 95% confidence interval 0.84 to 1.05; $P=.24$) between mechanical and manual CPR. In contrast, meta-analysis of nonrandomized studies demonstrated a benefit in favor of mechanical CPR (odds ratio 1.42; 95% confidence interval 1.21 to 1.67; $P<.001$). No interaction was found between the endorsed CPR guidelines (2000 versus 2005) and the CPR strategy ($P=.27$). Survival to discharge and neurologic outcome did not differ between strategies.

CONCLUSION:

Although there are lower-quality, observational data that suggest that mechanical CPR used at the rescuer's discretion could improve survival to hospital admission, the cumulative high-quality randomized evidence does not support a routine strategy of mechanical CPR to improve survival or neurologic outcome. These findings are irrespective of the endorsed CPR guidelines during the study periods.

DISPOSITIUS DE FEEDBACK

Sembla que només el TrueCPR millora la qualitat de la RCP.

1. Am J Emerg Med. 2015 Nov 4. pii: S0735-6757(15)00954-7. doi: 10.1016/j.ajem.2015.11.003. [Epub ahead of print]

Randomized trial of the chest compressions effectiveness comparing 3 feedback cardiopulmonary resuscitation devices and standard basic life support by nurses.

Truszewski Z1, Szarpak L2, Kurowski A3, Evrin T4, Zasko P3, Bogdanski L3, Czyzewski L5.

Abstract

BACKGROUND:

Out-of-hospital cardiac arrest is a leading cause of mortality and serious neurological morbidity in Europe. We aim to investigate the effect of 3 cardiopulmonary resuscitation (CPR) feedback devices on effectiveness of chest compression during CPR.

METHODS:

This was prospective, randomized, crossover, controlled trial. Following a brief didactic session, 140 volunteer nurses inexperienced with feedback CPR devices attempted chest compression on a manikin using 3 CPR feedback devices (TrueCPR, CPR-Ezy, and iCPR) and standard basic life support (BLS) without feedback.

RESULTS:

Comparison of standard BLS, TrueCPR, CPR-Ezy, and iCPR showed differences in the effectiveness of chest compression (compressions with correct pressure point, correct depth, and sufficient decompression), which are, respectively, 37.5%, 85.6%, 39.5%, and 33.4%; compression depth (44.6 vs 54.5 vs 45.6 vs 39.6 mm); and compression rate (129.4 vs 110.2 vs 101.5 vs 103.5 min⁻¹).

CONCLUSIONS:

During the simulated resuscitation scenario, only TrueCPR significantly affected the increased effectiveness compression compared with standard BLS, CPR-Ezy, and iCPR. Further studies are required to confirm the results in clinical practice.

ECG I FV

La desfibril·lació durant les compressions millora la fracció de compressions toràciques

1. CJEM. 2015 Nov 26:1-6. [Epub ahead of print]

Hands-on defibrillation and electrocardiogram artefact filtering technology increases chest compression fraction and decreases peri-shock pause duration in a simulation model of cardiac arrest.

Fernando SM1, Cheskes S2, Howes D1.

Abstract

BACKGROUND:

Reducing pauses during cardiopulmonary resuscitation (CPR) compressions result in better outcomes in cardiac arrest. Artefact filtering technology (AFT) gives rescuers the opportunity to visualize the underlying electrocardiogram (ECG) rhythm during chest compressions, and reduces the pauses that occur before and after delivering a shock. We conducted a simulation study to measure the reduction of peri-shock pause and impact on chest compression fraction (CCF) through AFT.

METHODS:

In a simulator setting, participants were given a standardized cardiac arrest scenario and were randomly assigned to perform CPR/defibrillation using the protocol from one of three experimental arms: 1) Standard of Care (pauses for rhythm analysis and shock delivery); 2) AFT (no pauses for rhythm analysis, but a pause for defibrillation); or 3) AFT with hands-on defibrillation (no pauses for rhythm analysis or defibrillation). The primary outcomes were CCF and peri-shock pause duration, with secondary outcomes of pre- and post-shock pause duration.

RESULTS:

AFT with hands-on defibrillation was found to have the highest CCF (86.4%), as compared to AFT alone (83.8%, $p < 0.001$), and both groups significantly improved CCF in comparison with the Standard of Care (76.7%, $p < 0.001$). AFT with hands-on defibrillation was associated with a reduced peri-shock pause (2.6 seconds) as compared to AFT alone (5.3 seconds, $p < 0.001$), and the Standard of Care (7.4 seconds, $p < 0.001$).

CONCLUSIONS:

In this cardiac arrest model, AFT results in a greater CCF by reducing peri-shock pause duration. There is also a small but detectable improvement in CCF with the addition of hands-on defibrillation.

Sobre els canvis de coagulació amb la hipotèrmia

1. Resuscitation. 2015 Nov 21. pii: S0300-9572(15)00880-1. doi: 10.1016/j.resuscitation.2015.11.007. [Epub ahead of print]

Changes in coagulation during therapeutic hypothermia in cardiac arrest patients.

Nielsen AK1, Jeppesen AN2, Kirkegaard H2, Hvas AM3.

Abstract

AIM:

Therapeutic hypothermia improves neurological outcome in patients resuscitated after out-of-hospital cardiac arrest. The aim was to investigate whether therapeutic hypothermia induced impaired coagulation.

METHODS:

Changes in coagulation were investigated in 22 out-of-hospital cardiac arrest patients treated with therapeutic hypothermia ($33\pm 1^{\circ}\text{C}$). Blood samples were obtained after 22 ± 2 hours of hypothermia and compared with normothermic samples drawn 48 hours later. The coagulation was evaluated with thromboelastometry (ROTEM[®]) using a sensitive low-tissue-factor assay. Leukocytes, haemoglobin, haematocrit, platelet count, activated partial thromboplastin time (aPTT), thrombin time, international normalised ratio (INR) and fibrinogen were also measured. Clinical information including use of anti thrombotic drugs was systematically collected.

RESULTS:

No significant changes were found in clotting time ($p=0.21$), clot formation time ($p=0.26$), time to maximum velocity ($p=0.52$) or maximum velocity ($p=0.17$) when results obtained at hypothermia were compared with results obtained at normothermia. Maximum clot firmness ($p<0.01$) and fibrinogen levels ($p<0.01$) were significantly higher in patients at normothermia. However, the fibrinogen levels were within the reference interval for all patients at both hypothermia and normothermia. Values of aPTT, thrombin time and INR at hypothermia and normothermia were not significantly different.

CONCLUSIONS:

No substantial difference in coagulation was found in hypothermia compared with normothermia in out-of-hospital cardiac arrest patients. The results indicate that treatment with hypothermia does not impair coagulation.

EFFECTES SECUNDARIS

Sobre les complicacions de les RCP en PCR extra i intrahospitalaris. Trencar costelles sembla anar lligat al bon pronòstic.

1. Resuscitation. 2015 Nov 20. pii: S0300-9572(15)00876-X. doi: 10.1016/j.resuscitation.2015.11.004. [Epub ahead of print]

Comparison of complications secondary to cardiopulmonary resuscitation between out-of-hospital cardiac arrest and in-hospital cardiac arrest.

Seung MK1, You JS1, Lee HS2, Park YS3, Chung SP1, Park I1.

Abstract

OBJECTIVE:

The aim of this study was to assess whether there was a significant difference in the complications of cardiopulmonary resuscitation (CPR) between out-of-hospital cardiac arrest (OHCA) and in-hospital cardiac arrest (IHCA) survivors using multidetector computed tomography (MDCT).

SUBJECTS AND METHODS:

We performed a retrospective analysis of prospective registry data. We enrolled both OHCA and IHCA patients who underwent successful CPR. We classified chest injuries secondary to chest compression into rib fractures, sternum fractures, and uncommon complications such as lung contusions and extrathoracic complications. We compared these complications according

to CPR locations. We also analysed risk factors for CPR complications using multiple regression analysis and classification and regression tree analysis.

RESULTS:

During the study period, a total of 148 patients were included in the primary analysis. Rib fractures were detected more in OHCA survivors than in IHCA survivors (74 patients (83.2%) vs. 37 patients (62.7%), $p=0.05$), and frequency of multiple rib fractures was higher in OHCA survivors than IHCA survivors (69 patients (77.5%) vs. 34 patients (57.6%), $p=0.01$). Although other complications were not significantly different between the groups, there was a trend for OHCA survivors to sustain more serious and direct high-energy related complications. Older age, longer CPR, and OHCA were significantly associated with incidence of rib fractures, multiple rib fractures, and number of rib fractures.

CONCLUSIONS:

Rib fractures were more likely to occur in OHCA survivors, and serious complications tended to occur more often in OHCA compared to IHCA survivors

ESTUDIS EXPERIMENTALS

Alteracions microcirculatòries durant la ressuscitació en el shock hemorràgic.

1. Injury. 2015 Nov 10. pii: S0020-1383(15)00694-4. doi: 10.1016/j.injury.2015.10.075. [Epub ahead of print]

Microcirculatory alterations during haemorrhagic shock and after resuscitation in a paediatric animal model.

González R1, Urbano J1, López J1, Solana MJ1, Botrán M2, García A2, Fernández SN1, López-Herce J3.

Abstract

BACKGROUND:

Haemorrhagic shock is frequent in paediatric trauma patients and after cardiac surgery, especially after cardiopulmonary bypass. It has demonstrated to be related to bad outcome.

OBJECTIVES:

To evaluate changes on microcirculatory parameters during haemorrhagic shock and resuscitation in a paediatric animal model. To determine correlation between microcirculatory parameters and other variables routinely used in the monitoring of haemorrhagic shock.

METHODS:

Experimental study on 17 Maryland pigs. Thirty minutes after haemorrhagic shock induction by controlled bleed animals were randomly assigned to three treatment groups receiving 0.9% normal saline, 5% albumin with 3% hypertonic saline, or 5% albumin with 3% hypertonic saline plus a bolus of terlipressin. Changes on microcirculation (perfused vessel density (PVD), microvascular blood flow (MFI) and heterogeneity index (HI)) were evaluated and compared with changes on macrocirculation and tisular perfusion parameters.

RESULTS:

Shock altered microcirculation: PVD decreased from 13.5 to 12.3mmmm-2 ($p=0.05$), MFI decreased from 2.7 to 1.9 ($p<0.001$) and HI increased from 0.2 to 0.5 ($p<0.001$). After treatment, microcirculatory parameters returned to baseline (PVD 13.6mmmm-2 ($p<0.05$), MFI 2.6 ($p<0.001$) and HI 0.3 ($p<0.05$)). Microcirculatory parameters showed moderate correlation with other parameters of tissue perfusion. There were no differences between treatments.

CONCLUSIONS:

Haemorrhagic shock causes important microcirculatory alterations, which are reversed after treatment. Microcirculation should be assessed during haemorrhagic shock providing additional information to guide resuscitation.

Injecció de Shen Fu per perllongar la FV

2. Chin Med J (Engl). 2015 20th Nov;128(22):3076-3082. doi: 10.4103/0366-6999.169095.

Effect of Shen-Fu Injection Pretreatment to Myocardial Metabolism During Untreated Ventricular Fibrillation in a Porcine Model.

Yuan W, Wu JY, Wang GX, Zhang Q, Li CS1.

Abstract

BACKGROUND:

Shen-Fu injection (SFI) can attenuate ischemia-reperfusion injury, protect cardiac function, and improve microcirculation during cardiopulmonary resuscitation. We hypothesized that SFI may also have an influence on myocardial metabolism during ventricular fibrillation (VF). In this study, we used SFI pretreatment prior to VF to discuss the changes of myocardial metabolism and catecholamine (CA) levels during untreated VF, trying to provide new evidence to the protection of SFI to myocardium.

METHODS:

Twenty-four pigs were divided into three groups: Saline group (SA group), SFI group, and SHAM operation group (SHAM group). Thirty minutes prior to the induction of VF, the SFI group received 0.24 mg/ml SFI through an intravenous injection; the SA group received an equal amount of sodium chloride solution. The interstitial fluid from the left ventricle (LV) wall was collected through the microdialysis tubes during VF. Adenosine diphosphate (ADP), adenosine triphosphate (ATP), and Na⁺ -K⁺ -ATPase and Ca²⁺ -ATPase enzyme activities were measured after untreated VF. Peak-to-trough VF amplitude and median frequency were analyzed for each of these 5-s intervals.

RESULTS:

The levels of glucose and glutamate were lower after VF in both the SA and SFI groups, compared with baseline, and the levels in the SFI group were higher than those in the SA group. Compared with baseline, the levels of lactate and the lactate/pyruvate ratio increased after VF in both SA and SFI groups, and the levels in the SFI group were lower than those in the SA group. In both the SA and SFI groups, the levels of dopamine, norepinephrine, and epinephrine increased significantly. There were no statistical differences between the two groups. The content of ATP, ADP, and phosphocreatine in the SFI group was higher than those in the SA group. The activity of LV Na⁺ -K⁺ -ATPase was significantly higher in the SFI group than in the SA group. Amplitude mean spectrum area (AMSA) was significantly lower in the SA and SFI groups at 8- and 12-min compared with 4-min. The AMSA in the SFI group was higher than that in the SA group at each time point during untreated VF.

CONCLUSIONS:

SFI pretreatment can improve myocardial metabolism and reduce energy exhaustion during VF, and it does not aggravate the excessive secretion of endogenous CAs.