

SETMANA 1

REGISTRES I REVISIONS

1. Br J Sports Med. 2015 May;49(9):597-8. doi: 10.1136/bjsports-2015-094764.

F-MARC: promoting the prevention and management of sudden cardiac arrest in football.

Kramer EB1, Dvorak J2, Schmied C3, Meyer T4

Abstract

Sudden cardiac death is the most common cause of unnatural death in football. To prevent and urgently manage sudden cardiac arrest on the football field-of-play, F-MARC (FIFA Medical and Research Centre) has been fully committed to a programme of research, education, standardisation and practical implementation. This strategy has detected football players at medical risk during mandatory precompetition medical assessments. Additionally, FIFA has (1) sponsored internationally accepted guidelines for the interpretation of an athlete's ECG, (2) developed field-of-play-specific protocols for the recognition, response, resuscitation and removal of a football player having sudden cardiac arrest and (3) introduced and distributed the FIFA medical emergency bag which has already resulted in the successful resuscitation of a football player who had a sudden cardiac arrest on the field-of-play. Recently FIFA, in association with the Institute of Sports and Preventive Medicine in Saarbrücken, Germany, established a worldwide Sudden Death Registry with a view to documenting fatal events on the football field-of-play. These activities by F-MARC are testimony to FIFA's continued commitment to minimising sudden cardiac arrest while playing football.

2. Postgrad Med J. 2016 Jan 6. pii: postgradmedj-2015-133575. doi: 10.1136/postgradmedj-2015-133575. [Epub ahead of print].

Predictors of inhospital mortality following out-of-hospital cardiac arrest: Insights from a single-centre consecutive case series.

Whittaker A1, Lehal M2, Calver AL1, Corbett S1, Deakin CD3, Gray H1, Simpson I1, Wilkinson JR1, Curzen N3.

Abstract

PURPOSE OF THE STUDY:

Out-of-hospital cardiac arrest (OHCA) has a poor prognosis despite bystander resuscitation and rapid transfer to hospital. Optimal management of patients after arrival to hospital continues to be contentious, especially the timing of emergency coronary angiography±revascularisation. Robust predictors of inhospital outcome would be of clinical value for initial decision-making.

STUDY DESIGN:

A retrospective analysis of consecutive patients who presented to a university hospital following OHCA over a 70-month period (2008-2013). Patients were identified from the emergency department electronic patient registration and coding system. For those patients who underwent emergency percutaneous coronary intervention, details were crosschecked with national databases.

RESULTS:

We identified 350 consecutive patients who were brought to our hospital following OHCA. Return of spontaneous circulation (ROSC) for >20 min was achieved either before arrival or inhospital in 196 individuals. From the 350 subjects, 114 (32.6%) survived to hospital discharge. When sustained ROSC was achieved, either before or inhospital, survival to discharge was 58.2% (114 of 196). Non-shockable rhythm, absence of bystander cardiopulmonary resuscitation, 'downtime' >15 min and initial pH ≤7.11 were predictors of inhospital death. 12% patients who underwent angiography in the presence of ST elevation had no acute coronary occlusion. 21% patients with acute coronary occlusion at angiography did not have ST elevation.

CONCLUSIONS:

In our cohort of patients with OHCA, those who achieve ROSC had a survival-to-discharge rate of 58.2%. We identified four predictors of inhospital death, which are readily available at the time of patient presentation. Reliance on ST elevation to decide about coronary angiography and revascularisation may be flawed. More data are required.

3. Acad Emerg Med. 2016 Jan 7. doi: 10.1111/acem.12898. [Epub ahead of print]

An analysis of Altmetrics in emergency medicine.

Barbic D1, Tubman M2, Lam H3, Barbic S4.

Abstract

OBJECTIVES:

Alternative level metrics (Altmetrics) are a new method to assess the sharing and spread of scientific knowledge. The primary objective of this study was to describe the traditional metrics and Altmetric scores of the fifty most frequently cited articles published in emergency medicine (EM) journals. Since many articles related to EM are published in other journals, the secondary aim of this study was to describe the Altmetric scores of the most frequently cited articles relevant to EM in other biomedical journals.

METHODS:

A structured search of the Institute for Scientific Information (ISI) Web of Science version of the Science Citation Index Expanded was conducted. The 200 most frequently cited articles in the top ten EM journals (2011 Journal Citation Report) were identified. The 200 most frequently cited articles from the rest of the medical literature, matching a pre-defined list of keywords relevant to the specialty of EM, were identified. Two authors reviewed the lists of citations for relevance to EM and a consensus approach was used to arrive at the final lists of the top 50 cited articles. The Altmetric scores for the top fifty cited articles in EM and other journals were determined. Descriptive statistics and Spearman correlation were performed.

RESULTS:

The highest Altmetric score for EM articles was 25.0, the mean was 1.9 [SD=5.0]. The EM journal with the highest average article Altmetric score was Resuscitation. The main clinical areas shared for articles from EM articles were trauma (mean 11.0, median 11.0 [SD=15.6]) and cardiac arrest (mean 2.7, median 0 [SD=5.8]). The highest Altmetric score for other journals was 176.0, mean 23.3 [SD=40.8]. The other journal with the highest average article Altmetric score was the New England Journal of Medicine. The main clinical areas shared for articles were critical care (mean score 36.5, median 36.5 [SD= 47.4], sepsis (mean 24.6, median 12.0 [SD=48.8]), cardiology (mean 19.2, median 7.0 [SD=35.6]) and infectious diseases (mean 17.0, median 17.0 [SD=12.7]). Spearman correlation demonstrated weakly positive correlation between citation counts and Altmetric scores for EM articles, and other journals.

CONCLUSIONS:

This study is the first analysis of Altmetric scores for the top cited articles in emergency medicine. We demonstrated that there is a mild correlation between citation counts and Altmetric scores for the top papers in emergency medicine and other biomedical journals. We also demonstrated that there is a gap between the sharing of the top articles in emergency medicine journals and those related to emergency medicine in other biomedical journals. Future research to explore this relationship and its temporal trends will benefit the understanding of the reach and dissemination of emergency medicine research within the scientific community and society in general

FÀRMACS

1. Am J Crit Care. 2016 Jan;25(1):12-20. doi: 10.4037/ajcc2016190.

Medication Errors in Cardiopulmonary Arrest and Code-Related Situations.

Flannery AH1, Parli SE2.

Abstract

PubMed/MEDLINE (1966-November 2014) was searched to identify relevant published studies on the overall frequency, types, and examples of medication errors during medical emergencies involving cardiopulmonary resuscitation and related situations, and the breakdown by type of error. The overall frequency of medication errors during medical emergencies, specifically situations related to resuscitation, is highly variable. Medication errors during such emergencies, particularly cardiopulmonary resuscitation and surrounding events, are not well characterized in the literature but may be more frequent than previously thought. Depending on whether research methods included database mining, simulation, or prospective observation of clinical practice, reported occurrence of medication errors during cardiopulmonary resuscitation and surrounding events has ranged from less than 1% to 50%. Because of the chaos of the resuscitation environment, errors in prescribing, dosing, preparing, labeling, and administering drugs are prone to occur. System-based strategies, such as infusion pump policies and code cart management, as well as personal strategies exist to minimize medication errors during emergency situations.

FV I DESFIBRIL·LACIÓ

1. PLoS One. 2016 Jan 7;11(1):e0141313. doi: 10.1371/journal.pone.0141313. eCollection 2016.

Integration of Attributes from Non-Linear Characterization of Cardiovascular Time-Series for Prediction of Defibrillation Outcomes.

Shandilya S1, Kurz MC2, Ward KR3,4, Najarian K5,3,4.

Abstract

OBJECTIVE:

The timing of defibrillation is mostly at arbitrary intervals during cardio-pulmonary resuscitation (CPR), rather than during intervals when the out-of-hospital cardiac arrest (OOH-CA) patient is physiologically primed for successful countershock. Interruptions to CPR may negatively impact defibrillation success. Multiple defibrillations can be associated with decreased post-resuscitation myocardial function. We hypothesize that a more complete picture of the cardiovascular system can be gained through non-linear dynamics and integration of multiple physiologic measures from biomedical signals.

MATERIALS AND METHODS:

Retrospective analysis of 153 anonymized OOH-CA patients who received at least one defibrillation for ventricular fibrillation (VF) was undertaken. A machine learning model, termed Multiple Domain Integrative (MDI) model, was developed to predict defibrillation success. We explore the rationale for non-linear dynamics and statistically validate heuristics involved in feature extraction for model development. Performance of MDI is then compared to the amplitude spectrum area (AMSA) technique.

RESULTS:

358 defibrillations were evaluated (218 unsuccessful and 140 successful). Non-linear properties (Lyapunov exponent > 0) of the ECG signals indicate a chaotic nature and validate the use of novel non-linear dynamic methods for feature extraction. Classification using MDI yielded ROC-AUC of 83.2% and accuracy of 78.8%, for the model built with ECG data only. Utilizing 10-fold cross-validation, at 80% specificity level, MDI (74% sensitivity) outperformed AMSA (53.6% sensitivity). At 90% specificity level, MDI had 68.4% sensitivity while AMSA had 43.3% sensitivity. Integrating available end-tidal carbon dioxide features into MDI, for the available 48 defibrillations, boosted ROC-AUC to 93.8% and accuracy to 83.3% at 80% sensitivity.

CONCLUSION:

At clinically relevant sensitivity thresholds, the MDI provides improved performance as compared to AMSA, yielding fewer unsuccessful defibrillations. Addition of partial end-tidal carbon dioxide (PetCO₂) signal improves accuracy and sensitivity of the MDI prediction model.

ECMO

1. Neth Heart J. 2016 Jan 4. [Epub ahead of print]

Out-of-hospital cardiac arrest: the prospect of E-CPR in the Maastricht region.

Sharma AS1, Pijls RW2, Weerwind PW3, Delnoij TS2,4, de Jong WC5, Gorgels AP2, Maessen JG3.

Abstract

AIM:

The current outcome of out-of-hospital cardiac arrest (OHCA) patients in the Maastricht region was analysed with the prospect of implementing extracorporeal cardiopulmonary resuscitation (E-CPR).

METHODS:

A retrospective analysis of adult patients who were resuscitated for OHCA during a 24-month period was performed.

RESULTS:

195 patients (age 66 [57-75] years, 82 % male) were resuscitated for OHCA by the emergency medical services and survived to admission at the emergency department. Survival to hospital discharge was 46.2 %. Notable differences between non-survivors and survivors were observed and included: age (70 [58-79] years) vs. (63 [55-72] years, $p = 0.01$), chronic heart failure (18 vs. 7 %, $p = 0.02$), shockable rhythm (67 vs. 99 %, $p < 0.01$), and return of spontaneous circulation (ROSC) at departure from the site of the arrest (46 vs. 99 %, $p < 0.01$) and on arrival to the emergency department (43 vs. 98 %, $p < 0.01$), respectively. Acute coronary syndrome was diagnosed in 32 % of non-survivors vs. 59 % among survivors, $p < 0.01$. Therapeutic hypothermia was provided in non-survivors (20 %) vs. survivors (43 %), $p < 0.01$. Percutaneous coronary intervention (PCI) was performed in 14 % of non-survivors while 52 % of survivors received PCI ($p < 0.01$). No statistical significance was observed in terms of gender, witnessed arrest, bystander CPR, or automated external defibrillator deployed among the cohort. At hospital discharge, moderately severe neurological disability was present in six survivors.

CONCLUSION:

These observations are compatible with the notion that a shockable rhythm, ROSC, and post-arrest care improve survival outcome. Potentially, initiating E-CPR in the resuscitation phase in patients with a shockable rhythm and no ROSC might serve as a bridge to definite treatment and improve survival outcome.

2. Acad Emerg Med. 2016 Jan 4. doi: 10.1111/acem.12893. [Epub ahead of print]

Deep hypothermic cardiac arrest treated by extracorporeal life support in a porcine model: does the rewarming method matter?

Debaty G1,2, Maignan M2, Perrin B1, Brouta A1, Guergour D3, Trocme C3, Bach V4, Tanguy S1, Briot R1,2.

Abstract

OBJECTIVES:

Extracorporeal life support (ECLS) is the reference rewarming technique of accidental deep hypothermic cardiac arrest (DHCA). This study was designed to examine the impact of different rewarming blood flow rates and temperature setting of ECLS on cardiopulmonary lesions after DHCA in a porcine model of accidental hypothermia.

METHODS:

Twenty-four pigs were cannulated for ECLS, cooled until DHCA occurred and subjected to 30 min of cardiac arrest. During the rewarming phase, we compared a low blood flow rate of 1.5

L/min versus a high flow rate of 3.0 L/min as well as two temperature setting rewarming strategies: a temperature during ECLS adjusted to 5°C above the central core temperature versus 38°C maintained throughout the rewarming phase. Cardiac output, hemodynamics and pulmonary function parameters were evaluated. Biological markers of ischemia/reperfusion injuries were analyzed at baseline and at the end of the experiment.

RESULTS:

DHCA occurred at 21.2±2°C. There was a trend for better cardiac output in groups with high blood flow (p=0.053), with no interaction between ECLS flow and temperature (p=0.63), a trend toward lower pulmonary vascular resistance (PVR) (0.075) and a significant decrease in arterial PVR in groups with high blood flow (p=0.013) with no interaction (p=0.47 and 0.60 for PVR and arterial PVR, respectively). Serum IL-6, TNF-α, RAGE and neuron-specific enolase were significantly increased between baseline and endpoint. The increase in the serum RAGE concentration was higher in the 38°C rewarming temperature groups compared to 5°C above adjusted temperature. There were no other significant differences in biomarkers.

CONCLUSION:

We developed a porcine model of DHCA treated by ECLS. Our data suggest that cardiac output tended to improve with a high-flow-rate rewarming strategy while a high temperature delta between core temperature and ECLS increased the RAGE markers of lung injury.

VENTILACIÓ

1. Am J Emerg Med. 2015 Dec 4. pii: S0735-6757(15)01056-6. doi: 10.1016/j.ajem.2015.11.070. [Epub ahead of print]

Mitigating hyperventilation during cardiopulmonary resuscitation.

Nikolla D1, Lewandowski T2, Carlson J3.

Abstract

Although multiple airway management and ventilation strategies have been proposed during cardiac arrest, the ideal strategy is unknown. Current strategies call for advanced airways, such as endotracheal intubation and supraglottic airways. These may facilitate hyperventilation which is known to adversely affect cardiopulmonary physiology. We provide a summary of conceptual models linking hyperventilation to patient outcomes and identify methods for mitigating hyperventilation during cardiac arrest.

2. Crit Care Resusc. 2015 Dec;17(4):274-9.

A randomised study of the effect of external distractors on the quality of ventilation in a simulated adult cardiac arrest.

Keast T1, Forrest AE2, Sleigh JW2, LaPine MP2.

Abstract

OBJECTIVE:

To establish the role of distraction in learner performance and workload when ventilating a mannequin during a simulated cardiac arrest.

DESIGN, SETTING AND PARTICIPANTS:

Observational, randomised simulation study of critical care doctors and nurses, set in the critical care department of Waikato Hospital, Hamilton, New Zealand

INTERVENTIONS:

Participants ventilated a mannequin for 1 minute in a neutral scenario that acted as a control, before immediately continuing to ventilate the mannequin in two experimental scenarios for 2 minutes each. Scenarios included one in which participants were asked questions based on resuscitation algorithms, and one in which the participants had to play the children's game hangman. The order of the experimental scenarios was randomised.

MAIN OUTCOME MEASURES:

The primary clinical performance measure was ventilatory rate. Secondary performance measures of peak airway and mean airway pressures were also analysed. Individual workload was assessed using a questionnaire based on the National Aeronautics and Space Administration task load index.

RESULTS:

We found no significant difference in any performance variable between the three scenarios. Workload was significantly lower in the control scenario. We found no difference in workload between the clinical and hangman scenarios. Doctors and nurses performed equally. Randomisation group had no effect on performance.

CONCLUSIONS:

Our study suggests that simple distractors have a potent effect on perceived clinician workload, even when performing the most simple of tasks, but may not strongly influence the objective performance of the task

CURES POST-RCE

1. J Am Heart Assoc. 2016 Jan 7;5(1). pii: e002670. doi: 10.1161/JAHA.115.002670.

Early Access to the Cardiac Catheterization Laboratory for Patients Resuscitated From Cardiac Arrest Due to a Shockable Rhythm: The Minnesota Resuscitation Consortium Twin Cities Unified Protocol.

Garcia S1, Drexel T2, Bekwelem W2, Raveendran G2, Caldwell E2, Hodgson L2, Wang Q3, Adabag S1, Mahoney B4, Frascone R5, Helmer G6, Lick C7, Conterato M8, Baran K9, Bart B10, Bachour F10, Roh S11, Panetta C12, Stark R13, Haugland M14, Mooney M15, Wesley K16, Yannopoulos D2.

Abstract

BACKGROUND:

In 2013 the Minnesota Resuscitation Consortium developed an organized approach for the management of patients resuscitated from shockable rhythms to gain early access to the cardiac catheterization laboratory (CCL) in the metro area of Minneapolis-St. Paul.

METHODS AND RESULTS:

Eleven hospitals with 24/7 percutaneous coronary intervention capabilities agreed to provide early (within 6 hours of arrival at the Emergency Department) access to the CCL with the intention to perform coronary revascularization for outpatients who were successfully resuscitated from ventricular fibrillation/ventricular tachycardia arrest. Other inclusion criteria were age >18 and <76 and presumed cardiac etiology. Patients with other rhythms, known do not resuscitate/do not intubate, noncardiac etiology, significant bleeding, and terminal disease were excluded. The primary outcome was survival to hospital discharge with favorable neurological outcome. Patients (315 out of 331) who were resuscitated from VT/VF and transferred alive to the Emergency Department had complete medical records. Of those, 231 (73.3%) were taken to the CCL per the Minnesota Resuscitation Consortium protocol while 84 (26.6%) were not taken to the CCL (protocol deviations). Overall, 197 (63%) patients survived to hospital discharge with good neurological outcome (cerebral performance category of 1 or 2). Of the patients who followed the Minnesota Resuscitation Consortium protocol, 121 (52%) underwent percutaneous coronary intervention, and 15 (7%) underwent coronary artery bypass graft. In this group, 151 (65%) survived with good neurological outcome, whereas in the group that did not follow the Minnesota Resuscitation Consortium protocol, 46 (55%) survived with good neurological outcome (adjusted odds ratio: 1.99; [1.07-3.72], P=0.03).

CONCLUSIONS:

Early access to the CCL after cardiac arrest due to a shockable rhythm in a selected group of patients is feasible in a large metropolitan area in the United States and is associated with a 65% survival rate to hospital discharge with a good neurological outcome.

SETMANA 2

COMPRESSIONS TORÀCIQUES

1. Am J Emerg Med. 2015 Nov 10. pii: S0735-6757(15)00959-6. doi: 10.1016/j.ajem.2015.11.008. [Epub ahead of print]

Identifying the optimal hand placement site for chest compression by measuring hand width and sternal length in young Korean adults.

Choi H1, Lee CC2, Kim HJ3, Singer AJ2.

Abstract

OBJECTIVE:

There are no specific guidelines regarding the exact hand placement location for effective chest compressions. This study was designed to identify the optimal hand placement site over the chest during cardiopulmonary resuscitation (CPR).

METHODS:

The sternal length (SL) of young Korean adults was measured as the distance from the suprasternal notch (SN) to the lower end of the sternum. In addition, the heel width of the hand (H) was measured 1 cm (H1) and 2 cm (H2) distal to the proximal end of the carpal bones.

RESULTS:

A total of 300 men and 300 women were enrolled. SL positively correlated with height ($R^2=14.2$), weight ($R^2=15.3$), BMI ($R^2=10.3$), H1 ($R^2=3.4$), and H2 ($R^2=5.0$). Mean H2 and half of the SL (SL/2) for the subgroups were M 8.4 and 10.1 cm, M' 8.3 and 9.7 cm, W 7.6 and 10.1 cm, and W' 7.4 and 9.5 cm, respectively (M, men taller than the mean; M', men shorter than the mean; W, women taller than the mean; W', women shorter than the mean). Mean H2 in men was 1.1 to 1.6 cm shorter than SL/2, whereas mean H2 in women was 2.2 to 2.9 cm shorter than SL/2.

CONCLUSIONS:

To find the most optimal chest compression point, from the patients' left side, CPR providers need to palpate the SN using the right little finger and placing the left heel one heel width (H2) from the SN. From the patient's right side, CPR providers should use the left little finger to palpate the SN and place the right heel one heel width (H2) from the SN.

2. West J Emerg Med. 2015 Dec;16(7):1135-40. doi: 10.5811/westjem.2015.9.28167. Epub 2015 Nov 13.

A Simulation-based Randomized Controlled Study of Factors Influencing Chest Compression Depth.

Mayrand KP1, Fischer EJ1, Ten Eyck RP1.

Abstract

INTRODUCTION:

Current resuscitation guidelines emphasize a systems approach with a strong emphasis on quality cardiopulmonary resuscitation (CPR). Despite the American Heart Association (AHA) emphasis on quality CPR for over 10 years, resuscitation teams do not consistently meet recommended CPR standards. The objective is to assess the impact on chest compression depth of factors including bed height, step stool utilization, position of the rescuer's arms and shoulders relative to the point of chest compression, and rescuer characteristics including height, weight, and gender.

METHODS:

Fifty-six eligible subjects, including physician assistant students and first-year emergency medicine residents, were enrolled and randomized to intervention (bed lowered and step stool readily available) and control (bed raised and step stool accessible, but concealed) groups. We

instructed all subjects to complete all interventions on a high-fidelity mannequin per AHA guidelines. Secondary end points included subject arm angle, height, weight group, and gender.

RESULTS:

Using an intention to treat analysis, the mean compression depths for the intervention and control groups were not significantly different. Subjects positioning their arms at a 90-degree angle relative to the sagittal plane of the mannequin's chest achieved a mean compression depth significantly greater than those compressing at an angle less than 90 degrees. There was a significant correlation between using a step stool and achieving the correct shoulder position. Subject height, weight group, and gender were all independently associated with compression depth.

CONCLUSION:

Rescuer arm position relative to the patient's chest and step stool utilization during CPR are modifiable factors facilitating improved chest compression depth.

REGISTRES I REVISIONS

1. Sao Paulo Med J. 2015 Dec;133(6):495-501. doi: 10.1590/1516-3180.2015.00472607. Epub 2015 Oct 20.

Cohort study on the factors associated with survival post-cardiac arrest.

Vancini-Campanharo CR1, Vancini RL2, Lira CA3, Andrade Mdos S4, Góis AF5, Atallah ÁN5.

Abstract

CONTEXT AND OBJECTIVE:

Cardiac arrest is a common occurrence, and even with efficient emergency treatment, it is associated with a poor prognosis. Identification of predictors of survival after cardiopulmonary resuscitation may provide important information for the healthcare team and family. The aim of this study was to identify factors associated with the survival of patients treated for cardiac arrest, after a one-year follow-up period.

DESIGN AND SETTING:

Prospective cohort study conducted in the emergency department of a Brazilian university hospital.

METHODS:

The inclusion criterion was that the patients presented cardiac arrest that was treated in the emergency department (n = 285). Data were collected using the In-hospital Utstein Style template. Cox regression was used to determine which variables were associated with the survival rate (with 95% significance level).

RESULTS:

After one year, the survival rate was low. Among the patients treated, 39.6% experienced a return of spontaneous circulation; 18.6% survived for 24 hours and of these, 5.6% were discharged and 4.5% were alive after one year of follow-up. Patients with pulseless electrical activity were half as likely to survive as patients with ventricular fibrillation. For patients with asystole, the survival rate was 3.5 times lower than that of patients with pulseless electrical activity.

CONCLUSIONS:

The initial cardiac rhythm was the best predictor of patient survival. Compared with ventricular fibrillation, pulseless electrical activity was associated with shorter survival times. In turn, compared with pulseless electrical activity, asystole was associated with an even lower survival rate.

2. J Am Heart Assoc. 2016 Jan 11;5(1). pii: e002892. doi: 10.1161/JAHA.115.002892.

Implementation of Pit Crew Approach and Cardiopulmonary Resuscitation Metrics for Out-of-Hospital Cardiac Arrest Improves Patient Survival and Neurological Outcome.

Hopkins CL1, Burk C2, Moser S2, Meersman J3, Baldwin C2, Youngquist ST4.

Abstract

INTRODUCTION:

Survival from out-of-hospital cardiac arrest (OHCA) varies by community and emergency medical services (EMS) system. We hypothesized that the adoption of multiple best practices to focus EMS crews on high-quality, minimally interrupted cardiopulmonary resuscitation (CPR) would improve survival of OHCA patients in Salt Lake City.

METHODS AND RESULTS:

In September 2011, Salt Lake City Fire Department EMS providers underwent a systemwide restructuring of care for OHCA patients that focused on the adoption of high-quality CPR with minimal interruptions and offline medical review of defibrillator data and feedback on CPR metrics. Victims were directed to ST-elevation myocardial infarction receiving centers. Prospectively collected data on patient survival and neurological outcome for all OHCA were compared. In the postintervention period, there were 407 cardiac arrests with 65 neurologically intact survivors (16%), compared with 330 cardiac arrests with 25 neurologically intact survivors (8%) in the preintervention period. Among patients who survived to hospital admission, a higher proportion in the postintervention period survived to hospital discharge (71/141 [50%] versus 36/98 [37%], $P=0.037$) and had a favorable neurological outcome (65 [46%] versus 25 [26%], $P=0.0005$) compared with patients treated before the protocol changes. The univariate odds ratio of the association between neurologically intact survival (cerebral performance category 1 and 2) and protocol implementation was 2.3 (95% CI 1.4 to 3.7, $P=0.001$). Among discharged patients, the distribution of cerebral performance category scores was more favorable in the postintervention period ($P<0.0001$).

CONCLUSIONS:

A multifaceted protocol, including several American Heart Association best practices for the resuscitation of patients with OHCA, was associated with improved survival and neurological outcome.

3. Crit Care. 2015 Feb 11;19:54. doi: 10.1186/s13054-015-0767-2.

MicroRNAs: new biomarkers and therapeutic targets after cardiac arrest?

Devaux Y1, Stammet P2, Friberg H3, Hassager C4, Kuiper MA5, Wise MP6, Nielsen N7; Biomarker subcommittee of TTM trial (Target Temperature Management After Cardiac Arrest, NCT01020916).

Abstract

Despite advances in resuscitation medicine, including target temperature management as part of post-cardiac arrest care, many patients will have a poor neurological outcome, most often resulting in death. It is a commonly held belief that the ability to prognosticate outcome at an early stage after cardiac arrest would allow subsequent health care delivery to be tailored to individual patients. However, currently available predictive methods and biomarkers lack sufficient accuracy and therefore cannot be generally recommended in clinical practice. MicroRNAs have recently emerged as potential biomarkers of cardiovascular diseases. While the biomarker value of microRNAs for myocardial infarction or heart failure has been extensively studied, less attention has been devoted to their prognostic value after cardiac arrest. This review highlights the recent discoveries suggesting that microRNAs may be useful both to predict outcome and to treat patients after cardiac arrest.

4. Crit Care Med. 2016 Feb;44(2):368-374.

Multicenter Comparison of Machine Learning Methods and Conventional Regression for Predicting Clinical Deterioration on the Wards.

Churpek MM¹, Yuen TC, Winslow C, Meltzer DO, Kattan MW, Edelson DP.

Abstract

OBJECTIVE:

Machine learning methods are flexible prediction algorithms that may be more accurate than conventional regression. We compared the accuracy of different techniques for detecting clinical deterioration on the wards in a large, multicenter database.

DESIGN:

Observational cohort study.

SETTING:

Five hospitals, from November 2008 until January 2013.

PATIENTS:

Hospitalized ward patients INTERVENTIONS:: None MEASUREMENTS AND MAIN RESULTS:: Demographic variables, laboratory values, and vital signs were utilized in a discrete-time survival analysis framework to predict the combined outcome of cardiac arrest, intensive care unit transfer, or death. Two logistic regression models (one using linear predictor terms and a second utilizing restricted cubic splines) were compared to several different machine learning methods. The models were derived in the first 60% of the data by date and then validated in the next 40%. For model derivation, each event time window was matched to a non-event window. All models were compared to each other and to the Modified Early Warning score, a commonly cited early warning score, using the area under the receiver operating characteristic curve (AUC). A total of 269,999 patients were admitted, and 424 cardiac arrests, 13,188 intensive care unit transfers, and 2,840 deaths occurred in the study. In the validation dataset, the random forest model was the most accurate model (AUC, 0.80 [95% CI, 0.80-0.80]). The logistic regression model with spline predictors was more accurate than the model utilizing linear predictors (AUC, 0.77 vs 0.74; $p < 0.01$), and all models were more accurate than the MEWS (AUC, 0.70 [95% CI, 0.70-0.70]).

CONCLUSIONS:

In this multicenter study, we found that several machine learning methods more accurately predicted clinical deterioration than logistic regression. Use of detection algorithms derived from these techniques may result in improved identification of critically ill patients on the wards.

5. J Adv Nurs. 2016 Jan 15. doi: 10.1111/jan.12897. [Epub ahead of print]

Temporal patterns of change in vital signs and Cardiac Arrest Risk Triage scores over the 48 hours preceding fatal in-hospital cardiac arrest.

Oh H¹, Lee K^{1,2}, Seo W¹.

Abstract

AIM:

To determine temporal patterns of vital sign and Cardiac Arrest Risk Triage score changes over the 48-hour period preceding cardiac arrest in an ICU setting.

BACKGROUND:

Vital sign instability usually occurs prior to cardiac arrest. However, few studies have been conducted on the temporal patterns of individual vital signs preceding cardiac arrest.

DESIGN:

A retrospective case-control study.

METHODS:

The study subjects were 140 ICU patients (1 June 2011-31 December 2012): 46 died of cardiac arrest (case group), 45 died of other illnesses (control I group) and 49 were discharged after recovering (control II group).

RESULTS:

Initial detectable changes in blood pressure appeared 18-20 hours and became dramatic at 5-10 hours before cardiac arrest. Noticeable changes in heart rates began at 4 hours and became more prominent at 2 hours pre-arrest. No apparent patterns in respiratory rate changes were observed. Body temperatures usually indicated a hypothermic state pre-arrest. Cardiac Arrest Risk Triage scores were 16-18 at 48 hours pre-arrest and then continuously increased to 20. Only mean values of systolic blood pressures were significantly different between the three study groups. Mean diastolic blood pressures, heart rates, respiratory rates and Cardiac Arrest Risk Triage scores differed between the case and control II groups and between the control I and II groups.

CONCLUSION:

The study demonstrates vital sign instability preceded cardiac arrest and that the temporal patterns of changes in individual vital signs and Cardiac Arrest Risk Triage scores differed between groups. The findings of this study may aid the development of management strategies for cardiac arrest.

TTM

1. Ann Intensive Care. 2016 Dec;6(1):4. doi: 10.1186/s13613-015-0104-6. Epub 2016 Jan 12.

Changes in cardiac arrest patients' temperature management after the 2013 "TTM" trial: results from an international survey

Deye N1, Vincent F2, Michel P3, Ehrmann S4, da Silva D5, Piagnerelli M6, Kimmoun A7, Hamzaoui O8, Lacherade JC9, de Jonghe B10, Brouard F11, Audoin C12, Monnet X13, Laterre PF14; SRLF Trial Group.

Abstract

BACKGROUND:

Therapeutic hypothermia (TH between 32 and 34 °C) was recommended until recently in unconscious successfully resuscitated cardiac arrest (CA) patients, especially after initial shockable rhythm. A randomized controlled trial published in 2013 observed similar outcome between a 36 °C-targeted temperature management (TTM) and a 33 °C-TTM. The main aim of our study was to assess the impact of this publication on physicians regarding their TTM practical changes.

METHODS:

A declarative survey was performed using the webmail database of the French Intensive Care Society including 3229 physicians (from May 2014 to January 2015).

RESULTS:

Five hundred and eighteen respondents from 264 ICUs in 11 countries fulfilled the survey (16 %). A specific attention was generally paid by 94 % of respondents to TTM (hyperthermia avoidance, normothermia, or TH implementation) in CA patients, whereas 6 % did not. TH between 32 and 34 °C was declared as generally maintained during 12-24 h by 78 % of respondents or during 24-48 h by 19 %. Since the TTM trial publication, 56 % of respondents declared no modification of their TTM practice, whereas 37 % declared a practical target temperature change. The new temperature targets were 35-36 °C for 23 % of respondents, and 36 °C for 14 %. The duration of overall TTM (including TH and/or normothermia) was declared as applied between 12 and 24 h in 40 %, and between 24 and 48 h in 36 %. In univariate analysis, the physicians' TTM modification seemed related to hospital category (university versus non-university hospitals, $P = 0.045$), to TTM-specific attention paid in CA patients ($P = 0.008$), to TH durations (<12 versus 24-48 h, $P = 0.01$), and to new targets temperature (32-34 versus 35-36 °C, $P < 0.0001$).

CONCLUSIONS:

The TTM trial publication has induced a modification of current practices in one-third of respondents, whereas the 32-34 °C target temperature remained unchanged for 56 %.

Educational actions are needed to promote knowledge translations of trial results into clinical practice. New international guidelines may contribute to this effort.

2. *Ann Card Anaesth.* 2016 Jan-Mar;19(1):4-14. doi: 10.4103/0971-9784.173013.

Mild therapeutic hypothermia in patients resuscitated from out-of-hospital cardiac arrest: A meta-analysis of randomized controlled trials.

Villablanca PA, Makkiya M, Einsenberg E, Briceno DF, Panagiota C, Menegus M, Garcia M, Sims D, Ramakrishna H1.

Abstract

AIMS:

Guidelines recommend mild therapeutic hypothermia (MTH) for survivors of out-of-hospital cardiac arrest (OHCA). However, there is little literature demonstrating a survival benefit. We performed a meta-analysis of randomized controlled trials (RCTs) assessing the efficacy of MTH in patients successfully resuscitated from OHCA.

MATERIALS AND METHODS:

Electronic databases were searched for RCT involving MTH in survivors of OHCA, and the results were put through a meta-analysis. The primary endpoint was all-cause mortality, and the secondary endpoint was favorable neurological function. Odds ratios (ORs) and 95% confidence intervals (CIs) were computed using the Mantel-Haenszel method. A fixed-effect model was used and, if heterogeneity (I^2) was >40 , effects were analyzed using a random model.

RESULTS:

Six RCT (n = 1400 patients) were included. Overall survival was 50.7%, and favorable neurological recovery was 45.5%. Pooled data demonstrated no significant all-cause mortality (OR, 0.81; 95% CI 0.55-1.21) or neurological recovery (OR, 0.77; 95% CI 0.47-1.24). No evidence of publication bias was observed.

CONCLUSION:

This meta-analysis demonstrated that MTH did not confer benefit on overall survival rate and neurological recovery in patients resuscitated from OHCA.

CURES POST-RCE

1. *Intern Emerg Med.* 2016 Jan 12. [Epub ahead of print]

Association between hemoglobin levels and clinical outcomes in adult patients after in-hospital cardiac arrest: a retrospective cohort study.

Wang CH1,2,3, Huang CH3, Chang WT3, Tsai MS3, Yu PH4, Wang AY3, Chen NC5, Chen WJ6,7.

Abstract

In addition to cardiac output, oxygen delivery is determined by the amount of oxygen carried by hemoglobin, which is estimated by the product of hemoglobin level and peripheral hemoglobin oxygen saturation (SpO₂). Optimal hemoglobin concentration for post-cardiac arrest syndrome (PCAS) has not yet been investigated thoroughly. We conducted a retrospective observational study in a single medical center. We included adult patients between 2006 and 2012 who experienced in-hospital cardiac arrest, and achieved sustained return of spontaneous circulation (ROSC). We used multivariable logistic regression analysis to identify factors associated with favorable neurological status at hospital discharge, defined as a score of 1 or 2 on the Cerebral Performance Category scale. Minimum hemoglobin concentration and SpO₂ during the initial 24 h after ROSC were used for analysis. Anemia was defined by the World Health Organization criteria as a hemoglobin concentration <12 g/dL in women and <13 g/dL in men. Of the 426 patients included in our analysis, 387 patients (90.8%) met the criteria for anemia. The mean minimum hemoglobin concentration among all the patients was 9.2 g/dL. The product of hemoglobin \times SpO₂ was correlated with a favorable neurological outcome (odds ratio 1.003, 95% confidence interval 1.002-1.004). According to

recommended SpO₂ by resuscitation guidelines (94-98 %), we calculated the corresponding range of minimum required hemoglobin concentration to be 8.6-9.0 g/dL for a favorable neurological outcome. Anemia common among PCAS patients. Neurological outcome in PCAS might be correlated with hemoglobin concentration following resuscitation.

2. West J Emerg Med. 2015 Dec;16(7):1007-13. doi: 10.5811/westjem.2015.10.28346. Epub 2015 Dec 8.

Troponin Marker for Acute Coronary Occlusion and Patient Outcome Following Cardiac Arrest.

Pearson DA¹, Wares CM¹, Mayer KA¹, Runyon MS¹, Studnek JR², Ward SL³, Kraft KM³, Heffner AC⁴.

Abstract

INTRODUCTION:

The utility of troponin as a marker for acute coronary occlusion and patient outcome after out-of-hospital cardiac arrest (OHCA) is unclear. We sought to determine whether initial or peak troponin was associated with percutaneous coronary intervention (PCI), OHCA survival or neurological outcome.

METHODS:

Single-center retrospective-cohort study of OHCA patients treated in a comprehensive clinical pathway from November 2007 to October 2012. Troponin I levels were acquired at presentation, four and eight hours after arrest, and then per physician discretion. Cardiac catheterization was at the cardiologist's discretion. Survival and outcome were determined at hospital discharge, with cerebral performance category score 1-2 defined as a good neurological outcome.

RESULTS:

We enrolled 277 patients; 58% had a shockable rhythm, 44% survived, 41% good neurological outcome. Of the 107 (38%) patients who underwent cardiac catheterization, 30 (28%) had PCI. Initial ED troponin (median, ng/mL) was not different in patients requiring PCI vs no PCI (0.32 vs 0.09, p=0.06), although peak troponin was higher (4.19 versus 1.57, p=0.02). Of the 85 patients who underwent cardiac catheterization without STEMI (n=85), there was no difference in those who received PCI vs no PCI in initial troponin (0.22 vs 0.06, p=0.40) or peak troponin (2.58 vs 1.43, p=0.27). Regarding outcomes, there was no difference in initial troponin in survivors versus non-survivors (0.09 vs 0.22, p=0.11), or those with a good versus poor neurological outcome (0.09 vs 0.20, p=0.11). Likewise, there was no difference in peak troponin in survivors versus non-survivors (1.64 vs 1.23, p=0.07), or in those with a good versus poor neurological outcome (1.57 vs 1.26, p=0.14).

CONCLUSION:

In our single-center patient cohort, peak troponin, but not initial troponin, was associated with higher likelihood of PCI, while neither initial nor peak troponin were associated with survival or neurological outcome in OHCA patients.

PEDIATRIA

1. Pediatr Emerg Care. 2016 Jan 12. [Epub ahead of print]

Out-of-Hospital Cardiac Arrest in the Pediatric Population in Hong Kong: A 10-Year Review at a University Hospital.

Law AK¹, Ng MH, Hon KE, Graham CA.

Abstract

AIM:

To describe the epidemiology and outcomes of out-of-hospital cardiac arrest (OHCA) in a Hong Kong (HK) pediatric population and to identify factors associated with favorable outcomes.

METHODS:

Retrospective case note review of patients younger than 18 years who presented to the emergency department of Prince of Wales Hospital, HK with cardiac arrest from 2003 to 2013. Patients were classified as infants (<1 year), children (1-11 years) and adolescents (12-18 years). Patient characteristics, OHCA details, interventions, and outcomes were reported following the Utstein format.

RESULTS:

There were 53 patients in the study (77.4% men) and 34.6% of patients had chronic illnesses. In the infant group, 35.7% had complicated pregnancies. The incidence of OHCA in HK was 5.37 per 100,000 person-years. Out-of-hospital cardiac arrest was identified by bystanders in 62.3%, but bystander cardiopulmonary resuscitation was provided in only 28.3%. Shockable rhythms were uncommon (9.4%). Most OHCA in infants had unknown causes. In children, commonest causes were respiratory illness and environmental hazards, and in adolescents, trauma and cardiogenic events. Overall survival to hospital discharge rate was 20.8%; 13.2% had good neurological outcomes. Bystander cardiopulmonary resuscitation (odds ratio [OR], 7.44; 95% confidence interval [95% CI], 1.75-31.7; P = 0.007), prehospital return of spontaneous circulation (OR, 11.4; 95% CI, 1.75-74.7; P = 0.013), and return of spontaneous circulation within 30 minutes (OR, 90.0; 95% CI, 11.1-727; P < 0.0005) were associated with survival to discharge.

CONCLUSIONS:

The incidence of OHCA in HK is comparable to global data. The outcome of OHCA in the pediatric population has improved over the decades. Better prehospital care could improve outcome.

TRAUMA

1. PLoS One. 2016 Jan 14;11(1):e0145963. doi: 10.1371/journal.pone.0145963. eCollection 2016.

Comparative Effectiveness of Emergency Resuscitative Thoracotomy versus Closed Chest Compressions among Patients with Critical Blunt Trauma: A Nationwide Cohort Study in Japan.

Suzuki K1, Inoue S2, Morita S2, Watanabe N2, Shintani A3, Inokuchi S2, Ogura S1.

Abstract

BACKGROUND:

Although emergency resuscitative thoracotomy is performed as a salvage maneuver for critical blunt trauma patients, evidence supporting superior effectiveness of emergency resuscitative thoracotomy compared to conventional closed-chest compressions remains insufficient. The objective of this study was to investigate whether emergency resuscitative thoracotomy at the emergency department or in the operating room was associated with favourable outcomes after blunt trauma and to compare its effectiveness with that of closed-chest compressions.

METHODS:

This was a retrospective nationwide cohort study. Data were obtained from the Japan Trauma Data Bank for the period between 2004 and 2012. The primary and secondary outcomes were patient survival rates 24 h and 28 d after emergency department arrival. Statistical analyses were performed using multivariable generalized mixed-effects regression analysis. We adjusted for the effects of different hospitals by introducing random intercepts in regression analysis to account for the differential quality of emergency resuscitative thoracotomy at hospitals where patients in cardiac arrest were treated. Sensitivity analyses were performed using propensity score matching.

RESULTS:

In total, 1,377 consecutive, critical blunt trauma patients who received cardiopulmonary resuscitation in the emergency department or operating room were included in the study. Of these patients, 484 (35.1%) underwent emergency resuscitative thoracotomy and 893 (64.9%)

received closed-chest compressions. Compared to closed-chest compressions, emergency resuscitative thoracotomy was associated with lower survival rate 24 h after emergency department arrival (4.5% vs. 17.5%, respectively, $P < 0.001$) and 28 d after arrival (1.2% vs. 6.0%, respectively, $P < 0.001$). Multivariable generalized mixed-effects regression analysis with and without a propensity score-matched dataset revealed that the odds ratio for an unfavorable survival rate after 24 h was lower for emergency resuscitative thoracotomy than for closed-chest compressions ($P < 0.001$).

CONCLUSIONS:

Emergency resuscitative thoracotomy was independently associated with decreased odds of a favorable survival rate compared to closed-chest compressions.

EXPERIMENTAL

1. Oxid Med Cell Longev. 2016;2016:7463407. doi: 10.1155/2016/7463407. Epub 2015 Dec 7.

The Responses of Tissues from the Brain, Heart, Kidney, and Liver to Resuscitation following Prolonged Cardiac Arrest by Examining Mitochondrial Respiration in Rats.

Kim J1, Perales Villarroel JP1, Zhang W1, Yin T1, Shinozaki K1, Hong A2, Lampe JW1, Becker LB1.

Abstract

Cardiac arrest induces whole-body ischemia, which causes damage to multiple organs. Understanding how each organ responds to ischemia/reperfusion is important to develop better resuscitation strategies. Because direct measurement of organ function is not practicable in most animal models, we attempt to use mitochondrial respiration to test efficacy of resuscitation on the brain, heart, kidney, and liver following prolonged cardiac arrest. Male Sprague-Dawley rats are subjected to asphyxia-induced cardiac arrest for 30 min or 45 min, or 30 min cardiac arrest followed by 60 min cardiopulmonary bypass resuscitation. Mitochondria are isolated from brain, heart, kidney, and liver tissues and examined for respiration activity. Following cardiac arrest, a time-dependent decrease in state-3 respiration is observed in mitochondria from all four tissues. Following 60 min resuscitation, the respiration activity of brain mitochondria varies greatly in different animals. The activity after resuscitation remains the same in heart mitochondria and significantly increases in kidney and liver mitochondria. The result shows that inhibition of state-3 respiration is a good marker to evaluate the efficacy of resuscitation for each organ. The resulting state-3 respiration of brain and heart mitochondria following resuscitation reinforces the need for developing better strategies to resuscitate these critical organs following prolonged cardiac arrest.

2. PLoS One. 2016 Jan 14;11(1):e0146524. doi: 10.1371/journal.pone.0146524. eCollection 2016.

Exhaled CO₂ Parameters as a Tool to Assess Ventilation-Perfusion Mismatching during Neonatal Resuscitation in a Swine Model of Neonatal Asphyxia.

Li ES1,2, Cheung PY2,3,4, O'Reilly M2,3, LaBossiere J4, Lee TF2, Cowan S3,5, Bigam DL4, Schmölzer GM2,3.

Abstract

BACKGROUND:

End-tidal CO₂ (ETCO₂), partial pressure of exhaled CO₂ (PECO₂), and volume of expired CO₂ (VCO₂) can be continuously monitored non-invasively to reflect pulmonary ventilation and perfusion status. Although ETCO₂ ≥ 14 mmHg has been shown to be associated with return of an adequate heart rate in neonatal resuscitation and quantifying the PECO₂ has the potential to serve as an indicator of resuscitation quality, there is little information regarding capnometric measurement of PECO₂ and ETCO₂ in detecting return of spontaneous circulation (ROSC) and survivability in asphyxiated neonates receiving cardiopulmonary resuscitation (CPR).

METHODS:

Seventeen newborn piglets were anesthetized, intubated, instrumented, and exposed to 45-minute normocapnic hypoxia followed by apnea to induce asphyxia. Protocolized resuscitation was initiated when heart rate decreased to 25% of baseline. Respiratory and hemodynamic parameters including ETCO₂, PECO₂, VCO₂, heart rate, cardiac output, and carotid artery flow were continuously measured and analyzed.

RESULTS:

There were no differences in respiratory and hemodynamic parameters between surviving and non-surviving piglets prior to CPR. Surviving piglets had significantly higher ETCO₂, PECO₂, VCO₂, cardiac index, and carotid artery flow values during CPR compared to non-surviving piglets.

CONCLUSION:

Surviving piglets had significantly better respiratory and hemodynamic parameters during resuscitation compared to non-surviving piglets. In addition to optimizing resuscitation efforts, capnometry can assist by predicting outcomes of newborns requiring chest compressions.

SETMANA 3

COMPRESSORS TORÀCICS MECÀNICS

1. Scand J Trauma Resusc Emerg Med. 2016 Jan 21;24(1):4. doi: 10.1186/s13049-016-0198-3.

Mechanical chest compressions in the coronary catheterization laboratory to facilitate coronary intervention and survival in patients requiring prolonged resuscitation efforts.

Wagner H1, Hardig BM2, Rundgren M3, Zughaft D4, Harnek J5, Götberg M6, Olivecrona GK7.

Abstract

BACKGROUND:

Resuscitation after cardiac arrest (CA) in the catheterization laboratory (cath-lab) using mechanical chest compressions (CC) during simultaneous percutaneous coronary intervention (PCI) is a strong recommendation in the 2015 European Resuscitation Council (ERC) guidelines. This study aimed at re-evaluating survival to hospital discharge and assess long term outcome in this patient population.

METHODS:

Patients presenting at the cath lab with spontaneous circulation, suffering CA and requiring prolonged mechanical CC during cath lab procedures between 2009 and 2013 were included. Circumstances leading to CA, resuscitation parameters and outcomes were evaluated within this cohort. For comparison, patients needing prolonged manual CC in the cath lab in the pre-mechanical CC era were evaluated. Six-month and one year survival with a mechanical CC treatment strategy from 2004 to 2013 was also evaluated.

RESULTS:

Thirty-two patients were included between 2009 and 2013 (24 ST-elevation myocardial infarction (STEMI), 4 non-STEMI, 2 planned PCI, 1 angiogram and 1 intra-aortic counterpulsation balloon pump insertion). Twenty were in cardiogenic shock prior to inclusion. Twenty-five were successfully treated with PCI. Median mechanical CC duration for the total cohort (n = 32) was 34 min (range 5-90), for the 15 patients with circulation discharged from the cath-lab, 15 min (range 5-90), and for the eight discharged alive from hospital, 10 min (range 5-52). Twenty-five percent survived with good neurological outcome at hospital discharge. Ten patients treated with manual CC were included with one survivor.

DISCUSSION:

Eighty-seven percent of the patients included in the mechanical CC cohort had their coronary or cardiac intervention performed during mechanical CC with an 80 % success rate. This shows

that the use of mechanical CC during an intervention does not seem to impair the interventional result substantially. The survival rate after one year was 87 %.

CONCLUSIONS:

Among patients suffering CA treated with mechanical CC in the cath-lab, 25 % had a good neurological outcome at hospital discharge compared to 10 % treated with manual CC. Long term survival in patients discharged from hospital is good.

REGISTRES I REVISIONS

1. Br J Anaesth. 2016 Feb;116(2):262-8. doi: 10.1093/bja/aev477.

Randomised comparison of the effectiveness of the laryngeal mask airway supreme, i-gel and current practice in the initial airway management of out of hospital cardiac arrest: a feasibility study.

Benger J1, Coates D2, Davies S3, Greenwood R4, Nolan J5, Rhys M6, Thomas M7, Voss S3.

Abstract

BACKGROUND:

The best initial approach to advanced airway management during out of hospital cardiac arrest (OHCA) is unknown. The traditional role of tracheal intubation has been challenged by the introduction of supraglottic airway devices (SGAs), but there is contradictory evidence from observational studies. We assessed the feasibility of a cluster-randomized trial to compare the i-gel SGA vs the laryngeal mask airway supreme (LMAS) vs current practice during OHCA.

METHODS:

We conducted a cluster-randomized trial in a single ambulance service in England, with individual paramedics as the unit of randomization. Consenting paramedics were randomized to use either the i-gel or the LMAS or usual practice for all patients with non-traumatic adult OHCA, that they attended over a 12-month period. The primary outcome was study feasibility, including paramedic and patient recruitment and protocol adherence. Secondary outcomes included survival to hospital discharge and 90 days.

RESULTS:

Of the 535 paramedics approached, 184 consented and 171 attended study training. Each paramedic attended between 0 and 11 patients (median 3; interquartile range 2-5). We recruited 615 patients at a constant rate, although the LMAS arm was suspended in the final two months following three adverse incidents. The study protocol was adhered to in 80% of patients. Patient characteristics were similar in the three study arms, and there were no differences in secondary outcomes.

CONCLUSION:

We have shown that a prospective trial of alternative airway management strategies in OHCA, cluster randomized by paramedic, is feasible.

2. Resuscitation. 2016 Jan 13. pii: S0300-9572(16)00013-7. doi: 10.1016/j.resuscitation.2015.12.011. [Epub ahead of print]

Impact of cardiopulmonary resuscitation duration on survival from paramedic witnessed out-of-hospital cardiac arrests: An observational study.

Nehme Z1, Andrew E2, Bernard S3, Smith K4.

Abstract

BACKGROUND:

Resuscitation guidelines often recommend ongoing cardiopulmonary resuscitation (CPR) efforts to hospital for out-of-hospital cardiac arrests (OHCA) witnessed by emergency medical service (EMS) personnel. In this study, we examine the relationship between EMS CPR duration and survival to hospital discharge in EMS witnessed OHCA patients.

METHODS:

Between January 2003 and December 2011, 1035 adult EMS witnessed arrests of presumed cardiac aetiology were included from the Victorian Ambulance Cardiac Arrest Registry. CPR duration was defined as the total sum of prehospital CPR time in minutes. Adjusted logistic regression analyses were used to assess the impact of EMS CPR duration on survival to hospital discharge.

RESULTS:

382 (37.3%) patients were discharged alive. The median CPR duration was 12min (95% CI: 11-13) overall, but was higher in non-survivors compared to survivors (24min vs. 2min, $p < 0.001$). The 99th percentile CPR duration in patients surviving to hospital discharge differed by the initial rhythm of arrest: 32min (95% CI: 27-44) overall, 32min (95% CI: 23-44) for ventricular fibrillation and pulseless ventricular tachycardia (VF/VT), 34min (95% CI: 30-34) for pulseless electrical activity (PEA), and 28min (95% CI: 21-28) for asystole. There were no survivors after 44min for all rhythms. After adjusting for prehospital confounders, every minute increase in CPR duration was associated with a 13% reduction in the odds of survival to hospital discharge (OR 0.87, 95% CI: 0.84-0.89, $p < 0.001$). The multivariable model predicted no chance of survival at or after a CPR duration of 48min for VF/VT patients, 47min for PEA patients and 45min for asystole patients.

CONCLUSION:

Resuscitation efforts exceeding 32min yielded less than 1% of survivors from EMS witnessed OHCA. On the basis of this data, EMS witnessed OHCA patients may benefit from on-going CPR efforts up to 48min in duration.

3. Resuscitation. 2016 Jan 13. pii: S0300-9572(16)00016-2. doi: 10.1016/j.resuscitation.2015.12.014. [Epub ahead of print]

Termination of resuscitation in the prehospital setting: A comparison of decisions in clinical practice vs. recommendations of a termination rule.

Verhaert DV1, Bonnes JL2, Nas J1, Keuper W1, van Grunsven PM3, Smeets JL1, de Boer MJ1, Brouwer MA1.

Abstract

BACKGROUND:

Of the proposed algorithms that provide guidance for in-field termination of resuscitation (TOR) decisions, the guidelines for cardiopulmonary resuscitation (CPR) refer to the basic and advanced life support (ALS)-TOR rules. To assess the potential consequences of implementation of the ALS-TOR rule, we performed a case-by-case evaluation of our in-field termination decisions and assessed the corresponding recommendations of the ALS-TOR rule.

METHODS:

Cohort of non-traumatic out-of-hospital cardiac arrest (OHCA)-patients who were resuscitated by the ALS-practising emergency medical service (EMS) in the Nijmegen area (2008-2011). The ALS-TOR rule recommends termination in case all following criteria are met: unwitnessed arrest, no bystander CPR, no shock delivery, no return of spontaneous circulation (ROSC).

RESULTS:

Of the 598 cases reviewed, resuscitative efforts were terminated in the field in 46% and 15% survived to discharge. The ALS-TOR rule would have recommended in-field termination in only 6% of patients, due to high percentages of witnessed arrests (73%) and bystander CPR (54%). In current practice, absence of ROSC was the most important determinant of termination [aOR 35.6 (95% CI 18.3-69.3)]. Weaker associations were found for: unwitnessed and non-public arrests, non-shockable initial rhythms and longer EMS-response times.

CONCLUSION:

While designed to optimise hospital transportations, application of the ALS-TOR rule would almost double our hospital transportation rate to over 90% of OHCA-cases due to the favourable arrest circumstances in our region. Prior to implementation of the ALS-TOR rule, local evaluation of the potential consequences for the efficiency of triage is to be

recommended and initiatives to improve field-triage for ALS-based EMS-systems are eagerly awaited.

4. Heart Lung Circ. 2015 Dec 18. pii: S1443-9506(15)01515-2. doi: 10.1016/j.hlc.2015.11.009. [Epub ahead of print]

Do Cardiac Rehabilitation Programs Offer Cardiopulmonary Resuscitation Training in Australia and New Zealand?

Cartledge SH1, Bray JE2, Stub D3, Krum H4, Finn J5.

Abstract

BACKGROUND:

Cardiac rehabilitation may provide an ideal environment to train high-risk cardiac patients and their families in cardiopulmonary resuscitation (CPR). However, whether this training is currently offered is unknown. The aims of this study were to: 1) describe the prevalence of CPR training in cardiac rehabilitation programs in Australia and New Zealand (NZ); and 2) examine perceived barriers and attitudes of cardiac rehabilitation coordinators towards providing CPR training.

METHODS:

We conducted a cross-sectional online survey of Australian and NZ cardiac rehabilitation coordinators.

RESULTS:

We received 253 completed surveys (46.7% response rate) (Australia n=208, NZ n=45). Cardiopulmonary resuscitation training was included in 23.9% of Australian programs and 56.6% in NZ. Common barriers to CPR training included lack of resources (49.7%) and a lack of awareness to provide CPR training for this high-risk group (33.7%). The majority of coordinators believed that lay people should be trained in CPR (96.3%) and were comfortable with recommending CPR training to this high-risk group (89.4%).

CONCLUSIONS:

While cardiac rehabilitation coordinators have positive attitudes towards CPR training, it is not currently part of most programs - particularly in Australia. Organisations formulating cardiac rehabilitation recommendations and guidelines should give consideration to include the provision of CPR training.

MONITORATGE

1. Adv Exp Med Biol. 2016;876:151-7. doi: 10.1007/978-1-4939-3023-4_19.

Detection of ROSC in Patients with Cardiac Arrest During Chest Compression Using NIRS: A Pilot Study.

Yagi T1,2, Nagao K3, Kawamorita T4, Soga T3,4, Ishii M4, Chiba N4, Watanabe K3,4, Tani S3, Yoshino A5, Hirayama A6, Sakatani K5,7.

Abstract

Return of spontaneous circulation (ROSC) during chest compression is generally detected by arterial pulse palpation and end-tidal CO₂ monitoring; however, it is necessary to stop chest compression during pulse palpation, and to perform endotracheal intubation for monitoring end-tidal CO₂. In the present study, we evaluated whether near-infrared spectroscopy (NIRS) allows the detection of ROSC during chest compression without interruption. We monitored cerebral blood oxygenation in 19 patients with cardiac arrest using NIRS (NIRO-200NX, Hamamatsu Photonics, Japan). On arrival at the emergency room, the attending physicians immediately assessed whether a patient was eligible for this study after conventional advanced life support (ALS) and employed NIRS to measure cerebral blood oxygenation (CBO) in the bilateral frontal lobe in patients. We found cerebral blood flow waveforms in synchrony with chest compressions in all patients. In addition, we observed abrupt increases of oxy-hemoglobin concentration and tissue oxygen index (TOI), which were associated with ROSC

detected by pulse palpation. The present findings indicate that NIRS can be used to assess the quality of chest compression in patients with cardiac arrest as demonstrated by the detection of synchronous waveforms during cardiopulmonary resuscitation (CPR). NIRS appears to be applicable for detection of ROSC without interruption of chest compression and without endotracheal intubation.

ENTRENAMIENTO

1. CJEM. 2016 Jan 18:1-7. [Epub ahead of print]

Accuracy of instructor assessment of chest compression quality during simulated resuscitation.

Brennan EE1, McGraw RC1, Brooks SC1.

Abstract

OBJECTIVES:

The 2010 American Heart Association Guidelines stress the importance of high quality cardiopulmonary resuscitation (CPR) as a predictor of survival from cardiac arrest. However, resuscitation training is often facilitated and evaluated by instructors without access to objective measures of CPR quality. This study aims to determine whether instructors experienced in the area of adult resuscitation (emergency department staff and senior residents) can accurately assess the quality of chest compressions as a component of their global assessment of a simulated resuscitation scenario.

METHODS:

This is a prospective observational study in which objective chest compression quality data (rate, depth, and fraction) were collected from the simulation manikin and compared to subjective instructor assessment. Data were collected during weekly simulation training sessions for residents, medical students, and nursing students.

RESULTS:

We included data from 24 simulated resuscitation scenarios assessed by 1 of 15 instructors. Subjective assessment of chest compression quality identified an adequate compression rate (100-120 compressions per minute) with a sensitivity of 0.17 (confidence interval [CI] 0.02-0.32) and specificity of 0.06 (CI -0.04-0.15), adequate depth (>50 mm) with a sensitivity of 0 and specificity of 0.38 (CI 0.18-0.57), and adequate fraction (>80%) with a sensitivity of 1 and a specificity of 0.25 (CI 0.08-0.42).

CONCLUSION:

Instructor assessment of chest compression rate, depth, and fraction demonstrates poor sensitivity and specificity when compared to the data from the simulation manikin. These results support the use of objective and technologically supported measures of chest compression quality for feedback during resuscitation education using simulators.

2. Am J Emerg Med. 2015 Dec 12. pii: S0735-6757(15)01062-1. doi: 10.1016/j.ajem.2015.12.006. [Epub ahead of print]

Assessing the efficacy of rescue equipment in lifeguard resuscitation efforts for drowning.

Barcala-Furelos R1, Szpilman D2, Palacios-Aguilar J3, Costas-Veiga J4, Abelairas-Gomez C5, Bores-Cerezal A6, López-García S7, Rodríguez-Nuñez A8.

Abstract

PURPOSE:

The whole drowning process usually occurs within seconds to a few minutes. An early rescue may stop and/or prevent most medical complications. Fins, rescue tube, and rescue board (RB) are the equipment most frequently used by lifeguards. Our objective was to compare, in a water rescue quasiexperimental trial, these different pieces of rescue equipment to define the

safest and with the lower rescue time as well as to assess their effects on the lifeguards' physiological state and cardiopulmonary resuscitation (CPR) performance.

METHOD:

A controlled trial was conducted to study the time effect of 4 different rescue techniques and assess CPR quality, along with the physiological effects of each rescue technique (blood lactate and subjective Borg's scale effort perception) on 35 lifeguards.

RESULTS:

Among the final sample subjects (n = 23), a total of 92 rescues were completed. Total water rescue time was longer without equipment (NE). The total rescue time was significantly lower using RB (P < .001). Similar good quality of CPR before and after water rescue was observed in all trials (P > .05), although correct ventilations represented less than 50% of total in all trials. Blood lactate increased after all rescues. The subjective effort Borg's scale showed significantly less effort using RB vs without equipment, fins, and fins and rescue tube.

CONCLUSION:

The use of propelling and/or floating equipment saves precious time with repercussions in the reduction of drowning mortality and morbidity. The RB offers a significant advantage. Lifeguards need more CPR training, especially considering the importance of efficient ventilations for drowning victims.

TTM

1. Thromb Haemost. 2016 Jan 21;115(5). [Epub ahead of print]

Platelet inhibition with prasugrel in patients with acute myocardial infarction undergoing therapeutic hypothermia after cardiopulmonary resuscitation.

Flierl U, Röntgen P, Zauner F, Tongers J, Berliner D, Bauersachs J, Schäfer A1.

Abstract

Acute myocardial infarction (AMI) is the leading cause for out-of-hospital cardiac arrest. Therapeutic hypothermia improves neurological outcome in combination with early revascularisation, but seems to affect clopidogrel responsiveness. The more potent thienopyridine prasugrel has not yet been sufficiently evaluated during therapeutic hypothermia. We investigated 23 consecutive AMI patients (61 ± 11 years) following out-of-hospital resuscitation undergoing revascularisation and therapeutic hypothermia. Prasugrel efficacy was assessed by the platelet-reactivity-index (PRI) before and 2, 4, 6, 12, 24, 48, and 72 hours (h) following a loading dose of 60 mg via a gastric tube. Mean PRI (± SD) was 70 ± 12 % prior to loading and 60±16 % (2 h, ns), 52 ± 21 % (4 h, p< 0.01), 42 ± 26 % (6 h, p< 0.01), 37 ± 21 % (12 h, p< 0.01), 27 ± 23 % (24 h, p< 0.01), 18 ± 14 % (48 h, p< 0.01), and 13 ± 10 % (72 h, p< 0.01) after loading. Sufficient platelet inhibition occurred later compared to stable AMI patients (6 h vs 2 h); however, high on-treatment platelet reactivity significantly decreased over time and was non-existent after 72 h (PRI> 50 %: 2 h: 72 %, 4 h: 52 %, 6 h: 43 %, 12 h: 29 %, 24 h: 17 %, 48 h: 5 %, 72 h: 0 %). There was no relation between 30-day mortality rate (26 %) and PRI values. Prasugrel significantly reduced platelet reactivity even during vasopressor use, analgosedation and therapeutic hypothermia. Despite a significant delay compared to stable AMI patients, sufficient platelet inhibition was reached in 83 % of patients within 24 h. Therefore, prasugrel administration via gastric tube might be a useful therapeutic strategy in these patients at high risk, providing potent and effective P2Y12 inhibition.

2. Resuscitation. 2016 Jan 16. pii: S0300-9572(16)00019-8. doi: 10.1016/j.resuscitation.2015.12.017. [Epub ahead of print]

Awakening following cardiac arrest: Determined by the definitions used or the therapies delivered?

Eid SM1, Albaeni A2, Vaidya D2, Nazarian SM3, Llinas R4, Chandra-Strobos N2.

Abstract

AIMS:

To investigate patterns of neurologic "awakening" in out-of-hospital cardiac arrest (OHCA) patients using different criteria for prognostication post-arrest.

METHODS:

Data was collected on 194 OHCA survivors to hospital admission. Patients were assigned to one of two groups based on whether they received therapeutic hypothermia (TH). Three separate criteria were used to assess neurologic "awakening": motor-GCS=6, total-GCS \geq 9, and CPC=1 or 2. Demographics, arrest characteristics and intensive care events were compared using unpaired t-test, Chi-square or nonparametric Wilcoxon rank-sum test as appropriate. Primary outcome was the time from arrest to neurologic awakening.

RESULTS:

Of 194 OHCA survivors, TH was implemented in 94 patients (48%). Compared to conventional care patients, hypothermia treated patients were more likely to be younger (58 vs. 69 years, $p<0.01$), and have a shockable arrest rhythm (27% vs. 10%, $p<0.01$). Using the three criteria (m-GCS=6, t-GCS \geq 9 & CPC=1 or 2), median time to awakening for patients in the hypothermia group versus the conventional therapy group were 6 [4,9] vs. 3 [2,5] days, 3 [3,5] vs. 2 [2,3] days, and 3 [3,6] vs. 2 [2,4] days respectively (all $p<0.01$) and prognostication using these criteria on day 3 yielded discordant results about which patients achieved awakening.

CONCLUSIONS:

Patients undergoing therapeutic hypothermia achieve meaningful neurologic "awakening" beyond 72h post-arrest. Use of different criteria for the assessment of neurologic "awakening" can yield different prognostication predictions which calls for standardization and validation of a single definition of "awakening" by the resuscitation community.

3. Resuscitation. 2016 Jan 13. pii: S0300-9572(16)00014-9. doi: 10.1016/j.resuscitation.2015.12.012. [Epub ahead of print]

Effect of therapeutic hypothermia on the outcomes after out-of-hospital cardiac arrest according to initial ECG rhythm and witnessed status: A nationwide observational interaction analysis.

Choi SW1, Shin SD2, Ro YS3, Song KJ4, Lee EJ5, Ahn KO6.

Abstract

BACKGROUND:

The use of mild therapeutic hypothermia (TH) in out-of-hospital cardiac arrest (OHCA) with shockable rhythms is recommended and widely used. However, it is unclear whether TH is associated with better outcomes in non-shockable rhythms.

METHODS:

This is a retrospective observational study using a national OHCA cohort database composed of emergency medical services (EMS) and hospital data. We included adult EMS-treated OHCA patients of presumed cardiac etiology who were admitted to the hospital during Jan. 2008 to Dec. 2013. Patients without hospital outcome data were excluded. The primary outcome was good neurological outcome at discharge; secondary outcome was survival to discharge. The primary exposure was TH. We compared outcomes between TH and non-TH groups using multivariable logistic regression, adjusting for individual and Utstein factors. Interactions of initial ECG rhythm and witnessed status on the effect of TH on outcomes were tested.

RESULTS:

There were 11,256 patients in the final analysis. TH was performed in 1703 patients (15.1%). Neurological outcome was better in TH (23.5%) than non-TH (15.0%) (Adjusted OR=1.25, 95% CI 1.05-1.48). The effect of TH on the odds for good neurological outcome was highest in the witnessed PEA group (Adjusted OR=3.91, 95% CI 1.87-8.14). Survival to discharge was significantly higher in the TH group (55.1%) than non-TH (35.9%) (Adjusted OR=1.76, 95% CI 1.56-2.00).

CONCLUSIONS:

In a nationwide observational study, TH is associated with better neurological outcome and higher survival to discharge. The effect of TH is greatest in witnessed OHCA patients with PEA as the initial ECG rhythm.

FV I ELECTROFISIOLOGIA

1. Circulation. 2016 Jan 21. pii: CIRCULATIONAHA.115.017885. [Epub ahead of print]

Programmed Ventricular Stimulation for Risk Stratification in the Brugada Syndrome: A Pooled Analysis.

Sroubek J1, Probst V2, Mazzanti A3, Delise P4, Castro Hevia J5, Ohkubo K6, Zorzi A7, Champagne J8, Kostopoulou A9, Yin X10, Napolitano C3, Milan DJ11, Wilde A12, Sacher F13, Borggreffe M14, Ellinor PT15, Theodorakis G9, Nault I8, Corrado D16, Watanabe I6, Antzelevitch C17, Allocca G16, Priori S3, Lubitz SA18.

Abstract

BACKGROUND:

The role of programmed ventricular stimulation (PVS) in identifying Brugada syndrome patients at highest risk for sudden death is uncertain.

METHODS AND RESULTS:

We performed a systematic review and pooled analysis of prospective observational studies of Brugada syndrome patients without a history of sudden cardiac arrest who underwent PVS. We estimated incidence rates and relative hazards of cardiac arrest or ICD shock. We analyzed individual-level data from 8 studies, comprising 1312 patients who experienced 65 cardiac events (median follow-up of 38.3 months). A total of 527 patients were induced into arrhythmias with up to triple extrastimuli. Induction was associated with cardiac events during follow-up (HR 2.66, 95%CI 1.44-4.92, $P < 0.001$), with the greatest risk observed among those induced with single or double extrastimuli. Annual event rates varied substantially by syncope history, presence of spontaneous type 1 ECG pattern, and arrhythmia induction. The lowest risk occurred in individuals without syncope and with drug-induced type 1 patterns (0.23%, 95%CI 0.05-0.68 [no induced arrhythmia with up to double extrastimuli]; 0.45%, 95%CI 0.01-2.49 [induced arrhythmia]) and the highest risk occurred in individuals with syncope and spontaneous type 1 patterns (2.55%, 95%CI 1.58-3.89 [no induced arrhythmia]; 5.60%, 95%CI 2.98-9.58 [induced arrhythmia]).

CONCLUSIONS:

In Brugada syndrome patients, arrhythmias induced with PVS are associated with future ventricular arrhythmia risk. Induction with fewer extrastimuli is associated with higher risk. However, clinical risk factors are important determinants of arrhythmia risk, and lack of induction does not necessarily portend low ventricular arrhythmia risk particularly in patients with high-risk clinical features.

POST ATURADA

1. Shock. 2016 Jan 8. [Epub ahead of print]

Decreased Monocyte Hla-Dr Expression in Patients After Non-Shockable Out-of-Hospital Cardiac Arrest.

Venet F1, Cour M, Demaret J, Monneret G, Argaud L.

Abstract

Out-of-hospital cardiac arrest (OHCA) constitutes a major health care problem with the development in immediate survivors of a post-cardiac arrest syndrome including systemic inflammatory response as observed in sepsis. As a decreased monocyte HLA-DR expression (mHLA-DR) has been repeatedly described in septic patients in association with an increased risk of death and nosocomial infections, we tested whether this immune alteration could also be observed after OHCA. Fifty-five non-shockable OHCA patients sampled at Day 0 (D0: within

4 h after OHCA), D1 (the next day), and D3: (after 2 additional days) were included. CD4+ lymphocyte count and mHLA-DR were evaluated by flow cytometry. We observed a marked decrease in mHLA-DR as early as D0 in patients compared to normal values. This decrease persisted till D3 and was associated with a moderate decrease in the number of circulating CD4+ lymphocytes. No correlations were identified between mHLA-DR and usual prognostic markers after OHCA. However, overtime evolution in mHLA-DR values appeared different between survivors and non-survivors with a quasi-systematic decrease between D1 and D3 in non-survivors versus an increased expression in survivors. In conclusion, this preliminary pilot study describes the occurrence of OHCA-induced immune alterations as illustrated by a decreased mHLA-DR and CD4+ lymphopenia. Furthermore, we show for the first time the differential overtime evolution in mHLA-DR between survivors and non-survivors without association with usual prognostic markers and multiple organ failure. These initial results should now be confirmed in a larger cohort of OHCA patients.

2. J Crit Care. 2015 Dec 11. pii: S0883-9441(15)00605-X. doi: 10.1016/j.jcrc.2015.12.002. [Epub ahead of print]

Early central diabetes insipidus: An ominous sign in post-cardiac arrest patients.

Chae MK1, Lee JH1, Lee TR1, Yoon H1, Hwang SY1, Cha WC1, Shin TG1, Sim MS2, Jo IJ1, Song KJ1, Rhee JE1, Jeong YK1.

Abstract

PURPOSE:

Central diabetes insipidus (CDI) after cardiac arrest is not well described. Thus, we aim to study the occurrences, outcomes, and risk factors of CDI of survivors after out-of-hospital cardiac arrest (OHCA).

MATERIALS AND METHODS:

We retrospectively analyzed post-OHCA patients treated at a single center. Central diabetes insipidus was retrospectively defined by diagnostic criteria. One-month cerebral performance category (CPC) scores were collected for outcomes.

RESULTS:

Of the 169 patients evaluated, 36 patients (21.3%) were diagnosed with CDI. All CDI patients had a poor neurologic outcome of either CPC 4 (13.9%) or CPC 5 (86.1%), and CDI was strongly associated with mortality. Age (odds ratio [OR], 0.96; 95% confidence interval [CI], 0.93-0.99), respiratory arrest (OR, 6.62; 95% CI, 1.23-35.44), asphyxia (OR, 9.26; 95% CI, 2.17-34.61), and gray to white matter ratio on brain computed tomogram (OR, 0.88; 95% CI, 0.81-0.95) were associated with the development of CDI. The onset of CDI was earlier ($P < .001$) and the maximum 24-hour urine output was larger ($P = .03$) in patients with worst outcomes

CONCLUSIONS:

All patients diagnosed with CDI had poor neurologic outcomes, and occurrence of CDI was associated with mortality. Central diabetes insipidus patients with death or brain death had earlier occurrence of CDI and more maximum urine output.

PEDIATRIA

1. CJEM. 2014 Sep;16(5):383-92.

Postresuscitation debriefing in the pediatric emergency department: a national needs assessment.

Sandhu N, Eppich W, Mikrogianakis A, Grant V, Robinson T, Cheng A; Canadian Pediatric Simulation Network (CPSN) Debriefing Consensus Group.

Abstract

OBJECTIVES:

The objectives of this study were to assess current postresuscitation debriefing (PRD) practices in Canadian pediatric emergency departments (EDs) and identify areas for improvement.

METHODS:

A national needs assessment survey was conducted to collect information on current PRD practices and perspectives on debriefing practice in pediatric EDs. A questionnaire was distributed to ED nurses, fellows, and attending physicians at 10 pediatric tertiary care hospitals across Canada. Summary statistics are reported.

RESULTS:

Data were analyzed from 183 participants (48.7% response rate). Although 88.8% of the participants believed that debriefing is an important process, 52.5% indicated that debriefing after real resuscitations occurs less than 25% of the time and 68.3% indicated that no expectation exists for PRD at their institution. Although 83.7% of participants believed that facilitators should have a specific skill set developed through formal training sessions, 63.4% had no previous training in debriefing. Seventy-two percent felt that medical and crisis resource management issues are dealt with adequately when PRD occurs, and 90.4% indicated that ED workload and time shortages are major barriers to effective debriefing. Most responded that a debriefing tool to guide facilitators might aid in multiple skills, such as creating realistic debriefing objectives and providing feedback with good judgment.

CONCLUSION:

PRD in Canadian pediatric EDs occurs infrequently, although most health care providers agreed on its importance and the need for skilled facilitators.

2. Arch Pediatr. 2016 Jan 13. pii: S0929-693X(15)00444-3. doi: 10.1016/j.arcped.2015.11.012. [Epub ahead of print]

[Newly formed French residents in pediatrics are not well prepared for conducting pediatric resuscitation after medical school].

[Article in French]

Drummond D1, Arnaud C2, Thouvenin G3, Guedj R2, Duguet A4, de Suremain N2, Petit A5.

Abstract

BACKGROUND:

Medical schools aim to prepare medical students for their residency responsibilities. However, in France, there is no assessment of medical students' skills when they start their residency.

GOAL:

The objective of this study was to assess the quality of basic life support delivered by first-year residents in pediatrics during a simulated pediatric cardiopulmonary arrest.

MATERIALS AND METHODS:

First-year residents in pediatrics were assessed during a simulated pediatric cardiopulmonary arrest. Their performance score (based on adherence to international guidelines) and no-flow and no-blow fractions were recorded.

RESULTS:

Forty-two first-year residents were evaluated. Their median performance score was 4 out of 13. No-blow and no-flow fractions were 55 and 81 %, respectively. There was no correlation between their skills and their knowledge assessed during the national ranking exam at the end of the 6th year of medical school.

CONCLUSION:

At the beginning of their residency, pediatric residents are not able to properly provide basic life support. The introduction of simulation in French medical schools may be an effective way to improve their skills.

3. Pediatr Emerg Care. 2016 Jan 16. [Epub ahead of print]

Relation of Medical History to the Pediatric Out-of-Hospital Cardiac Arrest Managed by Emergency Medical Services.

Heinonen K1, Lehtimäki N, Suominen P, Kuisma M, Harve H.

Abstract

OBJECTIVE:

The aim of this study was to examine the medical history of the pediatric out-of-hospital cardiac arrest (OHCA) patients to determine preexisting conditions that may relate to a later OHCA.

METHODS:

The study was a retrospective population-based cohort study in Helsinki (population 595,000) served by a single emergency medical service (EMS) system. All OHCA patients aged between 0 and 17 met by the local EMS from 2002 to 2011 were included. Medical records of the Helsinki University Hospital and its clinics were examined to find preexisting medical or surgical conditions.

RESULTS:

Forty-three patients experienced an EMS-treated OHCA. The annual incidence of an EMS-treated OHCA was 4.4 per 100,000 population younger than the age of 18 years. The mean age of patients was 7.9 years, largest age groups being younger than 1 year (30.2%) and 17 years (23.2%). The leading cause of OHCA was trauma (30.2%) followed by sudden infant death syndrome (18.6%) and cardiac reasons (14.0%). Nine patients (20.9%) survived to hospital, and 5 (11.6%) were discharged alive. Of the 43 patients, 28 (65.1%) had prior medical records in Helsinki University Hospital considering suspected or diagnosed chronic or otherwise significant conditions. The most common conditions were perinatal adaptation abnormalities (20.9%), psychiatric treatment (16.3%), and epilepsy (13.9%). Five patients had previous cardiac conditions. Trauma as a cause of OHCA was frequently represented among patients with prior psychiatric diagnosis or treatment. Among 17-year-old OHCA patients, 5 of 10 had psychiatric records.

TRAUMA

1. Am J Emerg Med. 2015 Dec 12. pii: S0735-6757(15)01060-8. doi: 10.1016/j.ajem.2015.12.004. [Epub ahead of print]

Is 15 minutes an appropriate resuscitation duration before termination of a traumatic cardiac arrest? A case-control study.

Chien CY1, Su YC2, Lin CC3, Kuo CW4, Lin SC5, Weng YM6.

Abstract

BACKGROUND:

Previous guidelines suggest up to 15 minutes of cardiopulmonary resuscitation (CPR) accompanied by other resuscitative interventions before terminating resuscitation of a traumatic cardiac arrest. The current study evaluated the duration of CPR according to outcome using the model of a county-based emergency medical services (EMS) system in Taiwan.

METHODS:

This study was performed as a prospectively defined retrospective review from EMS records and cardiac arrest registration between June 2011 and November 2012 in Taoyuan, Taiwan.

RESULTS:

A total of 396 patients were enrolled. Among the blunt injuries, most incidents were traffic accidents (66.5%) followed by falls (31.5%). Bystander CPR was performed in 34 patients (8.6%). Of the patients, 18.4% were sent to intermediate to advanced level traumatic care hospitals. Although 4.8% of patients survived for 24 hours, only 2.3% survived to discharge, and 0.8% achieved cerebral performance category 1 or 2. Among all patients who developed return of spontaneous circulation (ROSC), 14.3% of ROSC was achieved within 15 minutes since CPR. Except for 1, most patients who developed ROSC over 24 hours but did not survive to discharge received CPR more than 15 minutes. Four of 6 patients who survived to discharge achieved ROSC after CPR for more than 15 minutes (16, 18, 22, and 24 minutes). Three

patients discharged with cerebral performance category 1 or 2 received CPR for 6, 16, and 18 minutes, respectively.

CONCLUSIONS:

Fifteen minutes of CPR before terminating resuscitation is inappropriate for patients undergoing traumatic cardiac arrests, as longer duration resuscitation increases ROSC and survival.

EXPERIMENTAL

1. Am J Emerg Med. 2015 Dec 12. pii: S0735-6757(15)01067-0. doi: 10.1016/j.ajem.2015.12.011. [Epub ahead of print]

The benefits of respective and combined use of green tea polyphenols and ERK inhibitor on the survival and neurologic outcomes in cardiac arrest rats induced by ventricular fibrillation.

Zhuo X1, Xie L2, Shi FR2, Li N1, Chen X1, Chen M3.

Abstract

BACKGROUND:

Cerebral injury is a main factor contributing to a high mortality after cardiac arrest (CA)/cardiopulmonary resuscitation (CPR).

OBJECTIVE:

We sought to evaluate the effect of green tea polyphenols (GTPs) and ERK1/2 inhibitor PD98059 (PD) on the survival and neurologic outcomes after CA/CPR in rats.

METHODS:

First, rats were subjected to CA after CPR. The rats that restored spontaneous circulation were blindly allocated to the saline group (saline, IV, n = 12), the GTP group (GTPs, 10 mg/kg, IV, n = 12), the PD group (PD, 0.3 mg/kg, IV, n = 12), and the GTPs + PD group (GTPs, 10 mg/kg; PD, 0.3 mg/kg, IV, n = 12). Another 12 rats without experiencing CA and CPR were served as a sham group. Survival and the neurologic deficit score were observed for 72 hours after restoration of spontaneous circulation. Second, same experimental procedures were performed, and in 1 of 5 groups, animals were divided into 4 subgroups further according to the different time points (12, 24, 48, and 72 hours after restoration of spontaneous circulation [ROSC], n = 6/group). Brain tissues were harvested at relative time points for the morphologic evaluation as well as reactive oxygen species (ROS), malonylaldehyde, and superoxide dismutase (SOD) measurement.

RESULTS:

Green tea polyphenols, PD, and a combination of GTPs and PD used after ROSC alleviated the morphologic changes of the cerebrum. These 3 treatments also decreased the productions of ROS and malonylaldehyde, increased SOD activities in cerebral tissues, and improved the neurologic deficit and survival rates at 12, 24, 48, and 72 hours after ROSC.

CONCLUSIONS:

Administration of GTPs and PD after ROSC can alleviate cerebral injury, improve the survival and neurologic outcomes via reduction of ROS, and increase of SOD activity in a rat CA/CPR model.

2. Am J Emerg Med. 2015 Dec 1. pii: S0735-6757(15)01005-0. doi: 10.1016/j.ajem.2015.11.027. [Epub ahead of print]

Effects of tibial intraosseous and intravenous administration of vasopressin on kinetics and survivability in cardiac arrest.

Johnson D1, Giles K2, Acuna A3, Saenz C4, Bentley M5, Budinich C6.

Abstract

PURPOSE:

Purposes of this study were to compare tibial intraosseous (TIO) and intravenous (IV) administration of vasopressin relative to return of spontaneous circulation (ROSC) and time to

ROSC in an adult swine cardiac arrest model. In addition, the purposes were to compare the concentration maximum (Cmax), time to maximum concentration (Tmax), and odds of ROSC.

METHODS:

This was a between-subjects, prospective experimental study. Yorkshire swine (N = 21) were randomly assigned to 1 of 3 groups: TIO, IV, or control groups. The swine were anesthetized and instrumented, and then cardiac arrest was induced and sustained for 2 minutes. Cardiopulmonary resuscitation was initiated and continued for 2 minutes. Vasopressin was then administered via the TIO or IV route. Blood samples were collected for 4 minutes to determine the Cmax and Tmax of vasopressin. Concentration maximum and Tmax were calculated by use of liquid chromatography with mass spectrometry.

RESULTS:

There was no difference in ROSC between the TIO and IV groups (P = .63). The Cmax of vasopressin was significantly higher in the IV group compared to the TIO group (P = .017). However, there was no significant difference in ROSC, time to ROSC, or Tmax between groups (P > .05). All subjects had ROSC in both the IV and TIO groups, and none had ROSC in the control group. There was 225 times greater chance of survival for both the IV and TIO groups compared to the control group.

CONCLUSION:

The data support that the TIO is an effective route for vasopressin in a cardiac arrest model.

SETMANA 4

COMPRESIONS TORÀCIQUES

[Leed lo que el Profesor Xanthos mostró hace algunos años demostrando que no mejora la supervivencia en:](#) Am J Emerg Med. 2011 Jul;29(6):665-9)

1. Acad Emerg Med. 2016 Jan 23. doi: 10.1111/acem.12903. [Epub ahead of print]

A Comparison of the Effect of Interposed Abdominal Compression-Cardiopulmonary Resuscitation and Standard Cardiopulmonary Resuscitation Methods on End Tidal CO₂ and the Return of Spontaneous Circulation following Cardiac Arrest: A Clinical Trial.

Movahedi A1,2, Mirhafez SR3, Voshani HB4, Reihani H5, Kavosi A1, Ferns GA6, Malekzadeh J7.

Abstract

OBJECTIVES:

Sudden cardiac arrest is a major cause of death in the adult population of developed countries, with only 10-15 percent of cardiopulmonary resuscitations being successful. We aimed to compare the effects of interposed abdominal compression-cardiopulmonary resuscitation with standard cardiopulmonary resuscitation methods on end tidal CO₂ and the return of spontaneous circulation following cardiac arrest in a hospital setting.

METHODS:

After cardiac arrest was confirmed in a patient at Mashhad Ghaem Hospital, 80 cases were randomly assigned to one of the two methods of resuscitation; either interposed abdominal compression cardiopulmonary resuscitation (IAC-CPR), or standard cardiopulmonary resuscitation (STD-CPR), respectively. The inclusion criteria for the study were: non traumatic cardiac arrest, in patients between the age of 18-85 year and the presence of endotracheal tube. Exclusion criteria were: abdominal surgery in the past two weeks, active gastrointestinal bleeding, pulmonary embolism and suspected pregnancy. Data was analyzed using SPSS Statistics for Windows version 16.

RESULTS:

There was a significant difference between the two groups in end tidal CO₂ (P<0.003); but there was no significant difference as far as the return of spontaneous circulation (P>0.50).

CONCLUSION:

The increase in the end tidal CO₂ during interposed abdominal compression CPR is an indicator of the increase in cardiac output following the use of this method of CPR.

2. Am J Emerg Med. 2015 Dec 23. pii: S0735-6757(15)01122-5. doi: 10.1016/j.ajem.2015.12.066. [Epub ahead of print]

Comparative effectiveness of standard cardiopulmonary resuscitation vs active compression-decompression cardiopulmonary resuscitation with CardioPump for treatment of cardiac arrest.

Günaydın YK1, Çekmen B2, Akıllı NB3, Köylü R4, Sert ET5, Cander B6.

Abstract

BACKGROUND:

Despite all of the studies conducted on cardiopulmonary resuscitation (CPR), the mortality rate of cardiac arrest patients is still high. This has led to a search for alternative methods. One of these methods is active compression-decompression CPR (ACD-CPR) performed with the CardioPump.

OBJECTIVE:

The differences in the restoration of spontaneous circulation; the 1-, 7-, and 30-day survival rates; and hospital discharge rates between conventional CPR and ACD-CPR performed with CardioPump were investigated. In addition, the differences between the 2 methods with respect to complications were also investigated.

METHODS:

Our study was a prospective, randomized medical device study with a case-control group. Cardiac arrest cases brought to our emergency medicine clinic by the 112 emergency ambulances from out of hospital and patients who had developed cardiac arrest in hospital clinics between April 2015 and September 2015 were included in our study. For randomization, standard CPR was performed on odd days of each month, and CPR using CardioPump was performed on the even days of each month.

RESULTS:

A total of 181 patients were included in our study. The number of patients who received conventional CPR was determined as 86 (47.5%), and the number of patients who received CPR using the CardioPump was determined as 95 (52.5%). We did not identify any difference between conventional CPR and CardioPump ACD-CPR with respect to restoration of spontaneous circulation, discharge rates, and the 1-, 7-, and 30-day survival rates. (P=.384, P=.601, P=.997, P=.483, and P=.803, respectively) The complication rate was higher in the patient group that received conventional CPR (P<.001).

CONCLUSION:

As a result of our study, we did not obtain any evidence supporting the replacement of conventional

CPR with ACD-CPR performed using CardioPump.

REGISTRES I REVISIONS

1. J Am Coll Health. 2016 Jan 29:0. [Epub ahead of print]

Implementation of a High-Performance CPR Protocol at a Collegiate EMS Program.

Stefos KA1, Nable JV2.

Author information

Abstract

Out-of-hospital cardiac arrest (OHCA) is a significant public health issue. Though OHCA occurs relatively infrequently in the collegiate environment, educational institutions with on-campus emergency medical services (EMS) agencies are uniquely positioned to provide high quality resuscitation care in an expedient fashion. Georgetown University's on-campus EMS program recently updated its medical protocols to reflect the latest literature in resuscitation science. In

a high-performance CPR (HPCPR) resuscitation, minimally-interrupted chest compressions are emphasized, along with a coordinated team-based approach.

2. *Semin Respir Crit Care Med.* 2016 Feb;37(1):34-41. doi: 10.1055/s-0035-1570357. Epub 2016 Jan 28.

How Cool It Is: Targeted Temperature Management for Brain Protection Post-Cardiac Arrest.

Rabinstein AA1.

Author information

Abstract

Neurological recovery often determines outcome in patients resuscitated after cardiac arrest. Temperature control as a neuroprotective strategy has become standard of care. The first randomized trials showing improved neurological outcomes in patients treated with hypothermia with a target temperature of 33°C over a decade ago led to the inclusion of this intervention in practice guidelines and the broad adoption of hypothermia protocols across the world. More recently, large randomized trials showed no difference from targeting a temperature of 33 or 36°C and no benefit from pre-hospital induction of hypothermia. Temperature control remains a crucial part of post-cardiac arrest care. However, the optimal temperature target, timing of induction, duration of temperature control, and speed of rewarming are unclear. Similarly, the value of targeted temperature management in cases of in-hospital arrest and non-shockable rhythms is unknown. This article reviews the neuroprotective mechanisms of hypothermia, the evidence supporting targeted temperature management after cardiac resuscitation, areas of persistent uncertainty and controversy, and future research directions.

3. *J Intensive Care.* 2016 Jan 26;4:10. doi: 10.1186/s40560-016-0128-5. eCollection 2016.

Rationale, design, and profile of Comprehensive Registry of In-Hospital Intensive Care for OHCA Survival (CRITICAL) study in Osaka, Japan.

Yamada T1, Kitamura T2, Hayakawa K3, Yoshiya K4, Irisawa T4, Abe Y5, Ishiro M6, Uejima T7, Ohishi Y8, Kaneda K6, Kiguchi T9, Kishi M10, Kishimoto M11, Nakao S12, Nishimura T13, Hayashi Y14, Morooka T15, Izawa J16, Shimamoto T16, Hatakeyama T16, Matsuyama T16, Kawamura T16, Shimazu T4, Iwami T16.

Abstract

BACKGROUND:

We established a multi-center, prospective cohort that could provide appropriate therapeutic strategies such as criteria for the introduction and the effectiveness of in-hospital advanced treatments, including percutaneous coronary intervention (PCI), target temperature management, and extracorporeal cardiopulmonary resuscitation (ECPR) for out-of-hospital cardiac arrest (OHCA) patients.

METHODS:

In Osaka Prefecture, Japan, we registered all consecutive patients who were suffering from an OHCA for whom resuscitation was attempted and who were then transported to institutions participating in this registry since July 1, 2012. A total of 11 critical care medical centers and one hospital with an emergency care department participated in this registry. The primary outcome was neurological status after OHCA, defined as cerebral performance category (CPC) scale.

RESULTS:

A total of 688 OHCA patients were documented between July 2012 and December 2012. Of them, 657 were eligible for our analysis. Patients' average age was 66.2 years old, and male patients accounted for 66.2 %. The proportion of OHCA having a cardiac origin was 50.4 %. The proportion as first documented rhythm of ventricular fibrillation/pulseless ventricular tachycardia was 11.6 %, pulseless electrical activity 23.4 %, and asystole 54.5 %. After hospital arrival, 10.5 % received defibrillation, 90.8 % tracheal intubation, 3.0 % ECPR, 3.5 % PCI, and

83.1 % adrenaline administration. The proportions of 90-day survival and CPC 1/2 at 90 days after OHCA were 5.9 and 3.0 %, respectively.

CONCLUSIONS:

The Comprehensive Registry of In-hospital Intensive Care for OHCA Survival (CRITICAL) study will enroll over 2000 OHCA patients every year. It is still ongoing without a set termination date in order to provide valuable information regarding appropriate therapeutic strategies for OHCA patients

4. Circ Cardiovasc Qual Outcomes. 2016 Jan 26. pii: CIRCOUTCOMES.115.002317. [Epub ahead of print]

Paramedic Exposure to Out-of-Hospital Cardiac Arrest Resuscitation Is Associated With Patient Survival.

Dyson K1, Bray JE2, Smith K2, Bernard S2, Straney L2, Finn J2.

Abstract

BACKGROUND:

Although out-of-hospital cardiac arrest (OHCA) is a major public health problem, individual paramedics are rarely exposed to these cases. In this study, we examined whether previous paramedic exposure to OHCA resuscitation is associated with patient survival.

METHODS AND RESULTS:

For the period 2003 to 2012, we linked data from the Victorian Ambulance Cardiac Arrest Registry to Ambulance Victoria's employment data set. We defined exposure as the number of times a paramedic attended an OHCA where resuscitation was attempted in the 3 years preceding each case. Using a multivariable model adjusting for known predictors of survival, we measured the association between paramedic OHCA exposure and patient survival to hospital discharge. During the study period, there were 4151 paramedics employed and 48 291 OHCA cases (44% with resuscitation attempted). The median exposure of all paramedics was 2 (interquartile range 1-3) OHCA/year. Eleven percent of paramedics were not exposed to any OHCA cases. Increased paramedic exposure was associated with reduced odds of attempted resuscitation ($P < 0.001$). In the 3 years preceding each OHCA where resuscitation was attempted, the median exposure of the treating paramedics was 11 (interquartile range 6-17) OHCA. Compared with patients treated by paramedics with a median of ≤ 6 exposures during the previous 3 years (7% survival), the odds of survival were higher for patients treated by paramedics with > 6 to 11 (12%, adjusted odds ratio 1.26, 95% confidence interval 1.04-1.54), > 11 to 17 (14%, adjusted odds ratio 1.29, 95% confidence interval 1.04-1.59), and > 17 exposures (17%, adjusted odds ratio 1.50, 95% confidence interval 1.22-1.86). Paramedic years of experience were not associated with survival.

CONCLUSIONS:

Patient survival after OHCA significantly increases with the number of OHCA that paramedics have previously treated.

VENTILACIÓ

1. Semin Respir Crit Care Med. 2016 Feb;37(1):16-22. doi: 10.1055/s-0035-1570359. Epub 2016 Jan 28.

Too Much Oxygen: Hyperoxia and Oxygen Management in Mechanically Ventilated Patients.

Pannu SR1.

Abstract

Hyperoxia, or excess oxygen supplementation, prevails in the intensive care unit (ICU) without a beneficial effect and, in some instances, may cause harm. Recent interest and surge in clinical studies in mechanically ventilated critically ill patients has brought this to the attention of clinicians and researchers. Hyperoxia can cause alveolar injury, pulmonary edema, and subsequent systemic inflammatory response and is known to augment ventilator-associated

lung injury. Liberal oxygenation practices are also associated with increased mortality in subsets of critically ill patients with post-cardiac arrest, stroke, and traumatic brain injury. Most clinicians agree that oxygen titration should be done and, with appropriate safeguards, lower oxygenation targets may be acceptable and possibly beneficial in many critically ill patients. However, this problem is often overlooked. The use of periodic reminders and decision support may facilitate implementation of more precise oxygen titration at the bedside of critically ill patients. For implementing practice change, studies involving education and guidance of all health care staff involved in oxygen management are critical.

DONACIÓ

1. Resuscitation. 2016 Jan 23. pii: S0300-9572(16)00027-7. doi: 10.1016/j.resuscitation.2016.01.003. [Epub ahead of print]

Rates of Organ Donation in a UK Tertiary Cardiac Arrest Centre following Out-of-Hospital Cardiac Arrest.

Cheetham OV1, Thomas MJ2, Hadfield J3, O'Higgins F4, Mitchell C5, Rooney KD2.

Author information

Abstract

AIM:

To ascertain the rate of successful organ donation (OD) within patients who sustained an out of hospital cardiac arrest (OHCA) with initial return of spontaneous circulation (ROSC) and survival to hospital admission, but whom subsequently do not survive to hospital discharge.

METHODS:

A retrospective audit of ambulance service and hospital databases from January 2010 to January 2015 was undertaken in a United Kingdom tertiary-referral regional cardiac arrest centre. Crude denominator data for cardiac arrests was obtained from the regional ambulance service; the ICU database was interrogated for OHCA patient admissions and outcomes. Patients who died were cross-referenced against the local Organ Donation service database.

RESULTS:

Five hundred and fourteen {514} patients were admitted to ICU following OHCA over this five year period. Two hundred and forty-one {241} patients (47%) survived to hospital discharge and 273 (53%) died of whom 106 (39%) were referred to a Specialist Nurse for Organ Donation (SNOD). The conversion rate after the family was approached was 64%. Twenty-eight {28} patients proceeded to donation and 25 patients (24%) successfully donated at least one organ. On average, a patient proceeding to donation provided 1.9 organs.

CONCLUSIONS:

A proactive, systematic approach to OD in OHCA patients can provide a good conversion rate and substantial number of donors. Most donations occur after death from circulatory criteria. There is a positive socio-economic benefit with nearly £4m in savings to the health service within the next 5 years potentially being realised during this period by liberating patients from dialysis

TTM

1. Ther Hypothermia Temp Manag. 2016 Jan 25. [Epub ahead of print]

First Use of a New Device for Administration of Buspirone and Acetaminophen to Suppress Shivering During Therapeutic Hypothermia.

Honasoge A1, Parker B2, Wesselhoff K2, Lyons N3, Kulstad E2.

Abstract

Therapeutic hypothermia or targeted temperature management has been used after cardiac arrest to improve neurological outcomes and mortality. However, a side effect of temperature modulation is a centrally mediated shivering response. The Columbia Anti-Shivering Protocol

sets up a systematic method of intravenous (IV) and oral medication escalation to suppress this response and preserve the benefits of this therapy. We present the case of a 59-year-old male who began shivering after therapeutic hypothermia for cardiac arrest, leading to a persistent rise in core temperature despite adequate sedation. He was also found to have gastric contents similar to coffee grounds through nasogastric tube suction. The shivering was effectively suppressed and the rising core temperature plateaued using rectal acetaminophen and buspirone administered by means of a novel device, the Macy Catheter. Also, when used in conjunction with other protocol-driven medications, the patient was able to achieve a core temperature of 33°C. The Macy Catheter appears to be a useful approach to rectally administer buspirone and acetaminophen, using an easy-to-place, nonsterile atraumatic device that requires no radiographic confirmation of placement.

2. Am J Emerg Med. 2015 Dec 30. pii: S0735-6757(15)01159-6. doi: 10.1016/j.ajem.2015.12.077. [Epub ahead of print]

The impact of body mass index on patient survival after therapeutic hypothermia after resuscitation.

Breathett K1, Mehta N2, Yildiz V3, Abel E4, Husa R5.

Author information

Abstract

OBJECTIVES:

Therapeutic hypothermia improves survival in patients after cardiac arrest, yet the impact of body mass index (BMI) on survival is lesser known. We hypothesized that nonobese patients would have greater survival post-therapeutic hypothermia than obese patients.

METHODS:

We retrospectively evaluated 164 patients who underwent therapeutic hypothermia after resuscitation for cardiac arrest from January 2012 to September 2014. Logistic regression analysis was used to assess for survival based upon BMI and comorbidities (odds ratio, 95% confidence interval).

RESULTS:

Forty-one percent of patients were obese. Obese patients presented less frequently with ventricular fibrillation (P=.046) but had similar rates of pulseless electrical activity (P=.479) and ventricular tachycardia (P=.262) to nonobese patients. In multivariable analysis, BMI less than 30kg/m², hypertension, presence of pacemaker/implantable cardioverter-defibrillator, high glomerular filtration rate, and low neuron-specific enolase were all associated with increased survival post-therapeutic hypothermia, respectively: 0.36 (0.16-0.78), 0.28 (0.12-0.66), 0.23 (0.08-0.62), 0.25 (0.11-0.56), and 0.37 (0.14-0.96). Other comorbidities demonstrated no association with survival.

CONCLUSIONS:

Body mass index at least 30kg/m² compared with BMI less than 30kg/m² was a significant risk factor for mortality post-therapeutic hypothermia protocol. Absence of history of hypertension, lack of pacemaker/implantable cardioverter-defibrillator, high neuron-specific enolase, and renal disease had greater associations with death. Larger studies will be needed to validate these findings.

PEDIATRIA

1. Hosp Pediatr. 2016 Jan 1. pii: hpeds.2015-0132. [Epub ahead of print]

Pediatric Medical Emergency Team Events and Outcomes: A Report of 3647 Events From the American Heart Association's Get With the Guidelines-Resuscitation Registry.

Raymond TT1, Bonafide CP2, Praestgaard A3, Nadkarni VM4, Berg RA5, Parshuram CS6, Hunt EA; American Heart Association Get With the Guidelines-Resuscitation Investigators.

Abstract

OBJECTIVES:

To describe the clinical characteristics and outcomes of a large, multicenter cohort of pediatric medical emergency team (MET) events occurring in US hospitals reported to the American Heart Association's Get With the Guidelines-Resuscitation registry.

METHODS:

We analyzed consecutive pediatric (<18 years) MET events reported to the registry from January 2006 to February 2012.

RESULTS:

We identified 3647 MET events from 151 US hospitals: 3080 (84%) ward and 567 (16%) telemetry/step-down unit events; median age 3.0 years (interquartile range: 0.0-11.0); 54% male; median duration 29 minutes (interquartile range: 18-49). Triggers included decreased oxygen saturation (32%), difficulty breathing (26%), and staff concern (24%). Thirty-seven percent (1137/3059) were admitted within 24 hours before MET event. Within 24 hours before the MET event, 16% were transferred from a PICU, 24% from an emergency department, and 7% from a pediatric anesthesia care unit. Fifty-three percent of MET events resulted in transfer to a PICU; 3251 (89%) received nonpharmacologic interventions, 2135 (59%) received pharmacologic interventions, 223 (6.1%) progressed to an acute respiratory compromise event, and 17 events (0.5%) escalated to cardiopulmonary arrest during the event. Survival to hospital discharge was 93.3% (n = 3299/3536).

CONCLUSIONS:

Few pediatric MET events progress to respiratory or cardiac arrest, but most require nonpharmacologic and pharmacologic intervention. Median duration of MET event was 29 minutes (interquartile range: 18-49), and 53% required transfer to a PICU. Events often occurred within 24 hours after hospital admission or transfer from the PICU, emergency department, or pediatric anesthesia care unit and may represent an opportunity to improve triage and other systems of care.

2. Acta Paediatr. 2016 Jan 23. doi: 10.1111/apa.13339. [Epub ahead of print]

Resuscitators who compared four simulated infant cardiopulmonary resuscitation methods favoured the three to one compression to ventilation ratio.

Boldingh AM^{1,2}, Solevåg AL¹, Aasen E¹, Nakstad B^{1,2}.

Abstract

AIM:

Suboptimal cardiopulmonary resuscitation (CPR) is associated with a poor outcome and international guidelines state that resuscitators should optimise compression and ventilation techniques with as few interruptions as possible. We investigated compression and ventilation quality during simulated CPR with four compression to ventilation (C:V) methods.

METHODS:

In this crossover manikin study, 42 pairs of doctors, nurses, midwives and sixth-year medical students from two Norwegian hospitals provided two-minute resuscitation using the 3:1, 9:3 and 15:2 C:V methods and continuous chest compressions at 120 per minute with asynchronous ventilations (CCaV-120). We measured chest compression, ventilation mechanics and the resuscitators' preferences.

RESULTS:

C:V methods 3:1 and 9:3 provided comparable chest compressions and ventilation mechanics, whereas 15:2 produced fewer ventilations and lower minute volumes. The CCaV-120 method was significantly less effective than the 3:1 C:V ratio method: the chest compression depth was 1.9mm lower, there were 25 fewer chest compressions and 21 fewer ventilations per minute and the minute volume was 69ml lower. The 3:1 C:V method also provided better coordination between resuscitators.

CONCLUSION:

Our comparison of four simulated infant cardiopulmonary resuscitation methods favoured the 3:1 C:V method and the multi-disciplinary.

ELECTROFISIOLOGIA I FV

1. Resuscitation. 2016 Jan 21. pii: S0300-9572(16)00025-3. doi: 10.1016/j.resuscitation.2015.12.019. [Epub ahead of print]

Life-threatening ventricular tachyarrhythmias in the cardiology department: Implications for appropriate prescription of telemetry monitoring.

Zorzi A1, Peruzza F1, Stella F2, Del Monte A1, Migliore F1, Gasparetto N1, Badano L1, Iliceto S1, Corrado D3.

Author information

Abstract

BACKGROUND: In-hospital life-threatening ventricular arrhythmias (LT-VA) may complicate the course of cardiovascular patients. We aimed to assess the incidence, circumstances, determinants, and outcome of in-hospital LT-VA in order to help clinicians in prescribing appropriate levels of monitoring.

METHODS: The study population consisted of all 10,741 consecutive patients (65±15 years, 67.7% males) admitted to a cardiology department in 2009-2014. Terminally ill patients and those with primary arrhythmia diagnosis were excluded. The composite end-point included sudden arrhythmic death, ventricular fibrillation, unstable ventricular tachycardia and appropriate ICD shock unrelated to invasive interventions.

RESULTS: The incidence of LT-VA was 0.6%, with no differences regarding age, gender and primary diagnosis of coronary artery disease between patients with and without LT-VA. The incidence of LT-VA was significantly higher (1.2% versus 0.1%, $p<0.001$) among urgent compared with elective admissions and among patients with left ventricular ejection fraction (LV-EF) <45% (1.7% versus 0.2%, $p<0.001$). At multivariable analysis, urgent admission and LV-EF <45%, but not primary diagnosis of coronary artery disease, remained independent predictors of LT-VA. At the time of the event, 97.1% fulfilled either class I or class II indications for telemetry monitoring according to the American Heart Association guidelines. Survival to discharge with good neurological status was 70.6%.

CONCLUSIONS: Acutely ill patients with heart failure and LV systolic dysfunction showed the highest rate of LT-VAs, regardless of the underlying cardiac disease (ischemic or non-ischemic). Current guidelines demonstrated high sensitivity in identifying patients at risk. These findings may favor proper utilization of telemetry monitoring resources.

RECERCA EXPERIMENTAL

1. J Ethnopharmacol. 2016 Jan 19. pii: S0378-8741(16)30028-9. doi: 10.1016/j.jep.2016.01.027. [Epub ahead of print]

Effects of Shenfu injection on macrocirculation and microcirculation during cardiopulmonary resuscitation.

Wu J1, Li C2, Yuan W3.

Abstract

AIM OF THE STUDY:

To examine the effects of Shenfu injection (SFI) on macrocirculation and microcirculation during ventricular fibrillation (VF) and cardiopulmonary resuscitation (CPR).

MATERIALS AND METHODS:

Sixteen female Landrace pigs were used in this study. After anesthesia, coronary perfusion pressure (CPP) was measured, and then the abdominal cavity was opened to observe the mesenteric microcirculation with the aid of sidestream dark field imaging. Following the guidelines, we determined microvascular flow index, perfused vessel density and proportion of

perfused vessels both for large (diameter >20µm) and small (diameter <20µm) microvessels. SFI (1ml/kg) or saline was given by vein injection at 1h before inducing VF. CPR was initiated after 4min VF.

RESULTS:

The shocks and duration of CPR were less in the SFI group compared with saline group. As the occurrence of VF, the CPP suddenly dropped to near zero, and cannot be measured in the both groups. However, there was greater CPP during CPR and at 1h after return of spontaneous circulation in the SFI group than saline group. Compared with saline, SFI significantly improved the microcirculation parameters of large and small microvessels during VF and CPR.

CONCLUSIONS:

SFI can improve the microvascular blood flow and CPP during VF and CPR, and reduce the shocks and duration of CPR.

CASE REPORTS

1. CJEM. 2015 Mar;17(2):210-6. doi: 10.2310/8000.2014.141439.

Extracorporeal membrane oxygenation after protracted ventricular fibrillation cardiac arrest: case report and discussion.

Abu-Laban RB1, Migneault D1, Grant MR1, Dhingra V2, Fung A3, Cook RC4, Sweet D1.

Author information

Abstract

Extracorporeal membrane oxygenation (ECMO) is a method to provide temporary cardiac and respiratory support to critically ill patients. In recent years, the role of ECMO in emergency departments (EDs) for select adults has increased. We present the dramatic case of a 29-year-old man who was placed on venoarterial ECMO for cardiogenic shock and respiratory failure following collapse and protracted ventricular fibrillation cardiac arrest in our ED. Resuscitation efforts prior to ECMO commencement included 49 minutes of virtually continuous cardiopulmonary resuscitation (CPR), 11 defibrillations, administration of numerous medications, including a thrombolytic agent, while CPR was ongoing, percutaneous coronary intervention and stenting for a mid-left anterior descending coronary artery dissection and thrombotic occlusion, inotropic support, and intra-aortic balloon pump counterpulsation. Over the next 48 hours following ECMO commencement, the patient's cardiorespiratory function rapidly improved, and he was discharged home 9 days after admission with no neurologic sequelae. The history, indications, and increasing role of ECMO in a range of conditions, including cardiac arrest, are reviewed