Advanced life support

(Review)
Epinephrine is the primary drug administered during cardiopulmonary resuscitation (CPR) to reverse cardiac arrest. Epinephrine increases arterial blood pressure and coronary perfusion during CPR via alpha-1-adrenoceptor agonist effects. However, the dose, timing and indications for epinephrine use are based on limited animal data. Recent studies question whether epinephrine provides any overall benefit for patients. RECENT FINDINGS: A randomized controlled trial indicates that epinephrine for out-of-hospital cardiac arrest increases return of pulses, but does not significantly alter longer-term survival. Very large, well-controlled, observational studies suggest that, despite increases in return of pulses, epinephrine reduces long-term survival and functional recovery after CPR. Detrimental effects were greatest in patients found in ventricular fibrillation. Laboratory data suggest that harmful epinephrine-induced reductions in microvascular blood flow during and after CPR may offset the beneficial epinephrine-induced increase in arterial blood pressure during CPR. SUMMARY: The available clinical data confirm that epinephrine administration during CPR can increase short-term survival (return of pulses), but point towards either no benefit or even harm of this drug for more patient-centred outcomes (long-term survival or functional recovery). Prospective trials are needed to determine the correct dose, timing and patients for epinephrine in cardiac arrest.

(Retrospective observational study)
Epinephrine and vasopressin are the only vasopressors associated with return of spontaneous circulation (ROSC). While current guidelines recommend rapid and frequent vasopressor administration during cardiac arrest, delays in their administration in the out-of-hospital setting remain a concern. Objective. This study evaluated delays in vasopressor administration and their effect on field ROSC. Methods. This retrospective review included all adult patients who experienced cardiac arrest of medical origin and received field resuscitative efforts among 10 emergency medical services (EMS) systems. Data were abstracted from the EMS medical record and included response time intervals, calculated first-dose and inter-dosing intervals of vasopressors, and ROSC. Data were analyzed using Mann-Whitney tests, chi-square tests, and t-tests, survival analysis, and logistic regression, with p ≤ 0.05 indicating significance. Results. A total of 660 cardiac arrest patients were enrolled in the study. The mean EMS response time was 8.8 minutes; 52.7% of patients had witnessed cardiac arrests, 46.2% received bystander cardiopulmonary resuscitation (CPR), 23.0% had shockable initial rhythms, and 19.5% experienced field ROSC. In total, 1,913 doses of epinephrine and 111 doses of vasopressin were administered, with mean and 90th-percentile scene arrival–to–first drug intervals of 9.5 and 17 minutes, respectively. The mean EMS response time was 8.8 minutes; 52.7% of patients had witnessed cardiac arrests, 46.2% received bystander cardiopulmonary resuscitation (CPR), 23.0% had shockable initial rhythms, and 19.5% experienced field ROSC. In total, 1,913 doses of epinephrine and 111 doses of vasopressin were administered, with mean and 90th-percentile scene arrival–to–first drug intervals of 9.5 and 17 minutes, respectively. The mean and 90th-percentile inter-dosing intervals were 6.1 and 10 minutes, respectively. Patients experiencing ROSC had shorter scene arrival–to–first drug intervals than those without ROSC (8.1 vs. 9.8 min, p < 0.01), but there was no difference in the mean inter-dosing interval (6.8 vs. 6.0 min, p = 0.57). In the logistic regression analysis of ROSC, the adjusted odds ratio for call receipt–to–first drug interval ≤10 minutes was 1.91 (p = 0.04). Patients
receiving advanced airway control prior to vasopressor administration were less likely to have a call receipt–to–first drug interval within 10 minutes (4.0% vs. 17.3%, p < 0.01) and were less likely to attain ROSC (15.7% vs. 25.4%, p < 0.01). Conclusion. The interval between scene arrival and first administration of vasopressors is significantly shorter among patients who experience ROSC compared with those who do not. Airway control procedures delay vasopressor administration and reduce the likelihood of ROSC. Although the inter-dosing intervals of most patients were not consistent with current recommendations, there was no difference in the mean inter-dosing times between those who achieved ROSC and those who did not.

(Systematic review)

Human exposure to high altitude is increasing, through inhabitation of areas of high altitude, expansion of tourism into more remote areas, and air travel exposing passengers to typical altitudes equivalent to 8005 ft (2440 m). With ascent to high altitude, a number of acute and chronic physiological changes occur, influencing all systems of the human body. When considering that cardiac arrest is the second most common cause of death in the mountains and that up to 60% of the elderly have significant heart disease or other health problems, these changes are of particular importance as they may have a significant impact on resuscitation efforts. Current guidelines for resuscitation lack specific recommendations regarding treatment of cardiac arrest after ascent to high altitude or in aircraft. Therefore, we performed a comprehensive search in PubMed, CINAHL, Cochrane Library, and Scopus databases for studies relevant to resuscitation at high altitude. As no randomized trials evaluating the effects of physiological changes after ascent to high altitude on cardiopulmonary resuscitation were identified, our search was expanded to include all studies addressing important aspects on high altitude physiology, which could have a potential impact on the resuscitation of cardiac arrest victims. The aim of this review is to discuss the major physiological changes occurring after ascent to high altitude and their potential effects on cardiopulmonary resuscitation. Based on the available data, specific suggestions are proposed regarding resuscitation at high altitude.

(Retrospective observational study)

There is little information on geriatric emergency airway management. We sought to describe intubation practices and outcomes for emergency department (ED) geriatric and younger patients in Japan. We formed the Japanese Emergency Airway Network, a consortium of 11 medical centers, and prospectively collected data on ED intubations between 2010 and 2011. All patients 18 years or older who underwent emergent airway management were included in our study. Patients were divided into 2 groups: 18 to 64-year olds and 65 years or older. We present descriptive data as proportions with 95% confidence intervals (CI). The database recorded 3277 patients (capture rate 96%), and 3178 met the inclusion criteria. Of 3178 patients, 1844 (58%) were 65 years or older, 1334 (42%) were 18 to 64 years old, 809 (25%) were 80 years or older, and 407 (50%) of them were in the state of cardiac arrest. The geriatric group, compared to the younger group, had a higher success rate on the initial attempt (71% vs 64%; difference 7%; 95% CI 4%-10%); and in 2 attempts (90% vs 88%; difference 3%; 95% CI 1%-5%) or less. There was no significant difference in the adverse event rates by age group (difference 0%; 95% CI, 2% to 3%). In our multicenter study involving a large geriatric population, we found that geriatric patients were intubated with a higher success rate, compared to younger patients. These data provide implications for the geriatric ED airway practice that may lead to better patient-centered emergency care.

(Prospective observational study)

Outcome prediction for out-of-hospital cardiac arrest (OHCA) is of medical, ethical, and socioeconomic importance. We hypothesized that blood ammonia may reflect tissue hypoxia in OHCA patients and conducted this study to evaluate the prognostic value of ammonia for the return of spontaneous circulation (ROSC). Methods: This prospective, observational study was conducted in a tertiary university hospital between January 2008 and December 2008. The subjects consisted of OHCA patients who were sent to the emergency department (ED). The primary outcome was ROSC. The prognostic values were calculated for ammonia levels and the partial pressure of ammonia (pNH₃), and the results were depicted as a receiver operating characteristics curve with an area under the curve. Results: Among 119 patients enrolled in this study, 28 patients (23.5%) achieved ROSC. Ammonia levels and pNH₃ in the non-ROSC group were significantly higher than those in the ROSC group (167.0 μmol/L vs 80.0 μmol/L, P < .05; 2.61 × 10⁻⁵ vs 1.67 × 10⁻⁵ mm Hg, P < .05, respectively). The predictive capacity of area under the curve for ammonia and pNH₃ for non-ROSC was 0.85 (95% confidence interval, 0.75-0.95) and 0.73 (95% confidence interval, 0.61-0.84), respectively. The multivariate analysis confirmed that ammonia and pNH₃ are independent predictors of non-ROSC. The prognostic value of ammonia was better than that of pNH₃. The cutoff level for ammonia of 84 μmol/L was 94.5% sensitive and 75.0% specific for predicting non-ROSC with a diagnostic accuracy of 89.9%. Conclusions: Hyperammonemia on ED arrival is independently predictive of non-ROSC for OHCA patients. The findings may offer useful information for clinical management.


(Mannequin study)

The purpose of this study was to compare cardiopulmonary resuscitation (CPR) for simulated maternal cardiac arrest rendered during transport to the operating room with that rendered while stationary in the labor room. We hypothesized that the quality of CPR would deteriorate during transport. METHODS: Twenty-six teams composed of 2 providers (obstetricians, nurses, or anesthesiologists) were randomized to perform CPR on the Laerdal Resusci-Anne Skill Reporter mannequin during transport or while stationary. The primary outcome measure was the percentage of correctly delivered compressions, defined as compression rate >/=100 beats per minute, correct sternal hand placement, compression depth >/=1.5 inches (3.8 cm), and proper release. Secondary outcomes included interruptions in compressions, position of providers relative to the mannequin during the transport phase, and ventilation tidal volume. RESULTS: The median (interquartile range) percentage of correctly rendered compressions during phase II was 32% (10%-63%) in the transport group and 93% (58%-100%) in the stationary group (P = 0.002, 95% confidence interval of mean difference = 22%-58%). The median (interquartile range) compression rates were 124 (110-140) beats per minute in the transport group and 123 (115-132) beats per minute in the stationary group (P = 0.531). Interruptions in CPR were observed in 92% of transport and 7% of stationary drills (P < 0.001, 95% confidence interval of difference = 61%-92%). During transport, 18 providers kneeled next to the mannequin, 2 straddled the mannequin, and 4 ran alongside the gurney. Median (interquartile range) tidal volume was 270 (166-430) mL in the transport group and 390 (232-513) mL in the stationary group (P = 0.03). CONCLUSIONS: Our data confirm our hypothesis and demonstrate that transport negatively affects the overall quality of resuscitation on a mannequin during simulated maternal arrest. These findings, together with previously published data on transport-related delays when moving from the labor room to the operating room further strengthen recommendations that...
perimortem cesarean delivery should be performed at the site of maternal cardiac arrest.

(Clinical trial)

It is recommended that comatose survivors of out-of-hospital cardiac arrest should be cooled to 32° to 34°C for 12 to 24 hours. However, the optimal level of cooling is unknown. The aim of this pilot study was to obtain initial data on the effect of different levels of hypothermia. We hypothesized that deeper temperatures will be associated with better survival and neurological outcome. Methods and Results—Patients were eligible if they had a witnessed out-of-hospital cardiac arrest from March 2008 to August 2011. Target temperature was randomly assigned to 32°C or 34°C. Enrollment was stratified on the basis of the initial rhythm as shockable or asystole. The target temperature was maintained during 24 hours followed by 12 to 24 hours of controlled rewarming. The primary outcome was survival free from severe dependence (Barthel Index score ≥60 points) at 6 months. Thirty-six patients were enrolled in the trial (26 shockable rhythm, 10 asystole), with 18 assigned to 34°C and 18 to 32°C. Eight of 18 patients in the 32°C group (44.4%) met the primary end point compared with 2 of 18 in the 34°C group (11.1%) (log-rank P=0.12). All patients whose initial rhythm was asystole died before 6 months in both groups. Eight of 13 patients with initial shockable rhythm assigned to 32°C (61.5%) were alive free from severe dependence at 6 months compared with 2 of 13 (15.4%) assigned to 34°C (log-rank P=0.029). The incidence of complications was similar in both groups except for the incidence of clinical seizures, which was lower (1 versus 11; P=0.0002) in patients assigned to 32°C compared with 34°C. On the contrary, there was a trend toward a higher incidence of bradycardia (7 versus 2; P=0.054) in patients assigned to 32°C. Although potassium levels decreased to a greater extent in patients assigned to 32°C, the incidence of hypokalemia was similar in both groups. Conclusions: The findings of this pilot trial suggest that a lower cooling level may be associated with a better outcome in patients surviving out-of-hospital cardiac arrest secondary to a shockable rhythm. The benefits observed here merit further investigation in a larger trial in out-of-hospital cardiac arrest patients with different presenting rhythms.

Full text available for free at: http://circ.ahajournals.org/content/126/24/2826.full.pdf+html

(Retrospective observational study)

Hypothermia improves neurologic recovery compared to normothermia after resuscitation from out-of-hospital ventricular fibrillation, but may or may not be beneficial for patients resuscitated from in-hospital cardiac arrest. Therefore, we evaluated the effect of induced hypothermia in a large cohort of patients with in-hospital cardiac arrest. Methods: Retrospective analysis of multi-center prospective cohort of patients with in-hospital cardiac arrest enrolled in an ongoing quality improvement project. Included were adults with a pulseless event in an in-patient hospital ward of a participating institution who achieved restoration of spontaneous circulation between 2000 and 2009. The exposure of interest was induced hypothermia. The primary outcome was survival to discharge. The secondary outcome was neurological status at discharge. Analyses evaluated all eligible patients; those with a shockable rhythm; or those with endotracheal tube inserted after resuscitation; and the effect of no hypothermia versus hypothermia (lowest temperature > 32 °C but ≤ 34 °C) versus overcooled (≤32 °C). Associations were assessed using propensity score methods. Results: Included were 8316 patients with complete data, of whom 214 (2.6%) had hypothermia induced and 2521 (30%) survived to discharge. Of patients reported to receive hypothermia, only 40% were documented as achieving a temperature between 32 °C and 34 °C. Adjusted
for known potential confounders using propensity score methods, induced hypothermia was associated with an odds ratio of survival of 0.90 (95% confidence interval: 0.65, 1.23; p-value = 0.49) compared to no hypothermia. Induced hypothermia was associated with an odds ratio of neurologically-favorable survival of 0.93 (95% confidence interval: 0.65, 1.32; p-value = 0.68) compared to no hypothermia. For patients with shockable first-recorded rhythm, induced hypothermia was associated with an odds ratio of survival of 1.43 (95% confidence interval: 0.68, 3.01; p-value = 0.35) compared to no hypothermia. Conclusion: Hypothermia is induced infrequently in patients resuscitated from in-hospital cardiac arrest with only 40% achieving target temperatures. Induced hypothermia was not associated with improved or worsened survival or neurologically-favorable survival. The lack of benefit in this population may reflect lack of effect, inefficient application of the intervention, or residual confounding. High-quality controlled studies are required to better characterize the effect of induced hypothermia in this population.


(Retrospective observational study)
Objectives: To determine the rate of appropriate documentation of endotracheal tube (ET) position confirmation in the American Heart Association's Get With the Guidelines-Resuscitation (GWTG-R) and to determine whether outcomes of patients who experience in-hospital cardiac arrest differ in relation to documentation rate. Design: Analysis of data from the GWTG-R, a prospective observational registry of in-hospital cardiac arrest and resuscitation. Setting: Database containing clinical information from the 507 hospitals participating in the GWTG-R. Patients: Adults resuscitated after in-hospital cardiac arrest. Measurements: The rate of appropriate documentation of ET position confirmation, defined as the use of capnography or an esophageal detector device (EDD); relationship between appropriate documentation of ET position confirmation and return of spontaneous circulation (ROSC) or survival to hospital discharge. Proportions with 95% CI are reported for prevalence data. Binary logistic regression was used to determine the relationship between appropriate documentation of ET position confirmation and outcome (ROSC, survival to hospital discharge). Adjusted and unadjusted odds ratios are reported. Main results: Of the 176,054 patients entered into the GWTG-R database, 75,777 had an ET placed. For 13,263 (17.5%) of these patients, ET position confirmation was not documented in the chart. Auscultation alone was documented in 19,480 (25.7%) cases. Confirmation of ET position by capnography or EDD was documented in 43,034 (56.8%) cases. ROSC occurred in 39,063 (51.6%), and 13,474 (17.8%) survived to discharge. Patients whose ET position was confirmed by capnography or EDD were more likely to have ROSC (adjusted OR 1.229 [1.179, 1.282]) and to survive to hospital discharge (adjusted OR 1.093 [1.033, 1.157]). Conclusion: Documentation of ET position confirmation in patients who experience cardiac arrest is suboptimal. Appropriate documentation of ET position confirmation in the GWTG-R is associated with greater likelihood of ROSC and survival to hospital discharge.


(Mannequin study)
Study objective: To assess whether using interventions such as laryngeal mask airways (LMA) and IO lines lead to improved resuscitation in a simulated cardiac arrest when compared to standard methods of endotracheal intubation (ETI) and central line placement. Methods: Emergency Medicine residents at a single academic center were grouped into teams of four. Each team participated in two simulated ventricular fibrillation
cardiac arrests using a high fidelity simulator. Peripheral IV access was unobtainable. Only ETI supplies and a central line kit were available in one case (control) and in the other case those supplies were replaced by an LMA and an EZ-IO drill kit (experimental). Groups were randomized to which set up they were given first. Data examined included time to airway placement, duration and success rate of airway placement, time to vascular access, time to defibrillation, and percent hands off time. Results: 44 residents in 11 teams participated. Mean time to airway was shorter in the experimental group (122.8 seconds (s) vs. 265.6 s, p = 0.001). Mean duration of airway attempt was also shorter (7.6 s vs. 22.7 s, p = 0.002). Time to access was shorter in the experimental group (49.0 s vs. 194.6 s, p < 0.001). Time to defibrillation and percent hands off time did not significantly differ between the two groups. Conclusion: Use of an LMA and an IO device led to significantly faster establishment of an airway and vascular access in a simulated cardiac arrest. The variation in devices did not affect time to defibrillation or percent hands off time.


(Review)
Use of the Valsalva manoeuvre (VM) as a first-line management tool for the reversion of supraventricular tachycardia (SVT) in both emergency medicine and prehospital emergency-care settings has presented challenges, requiring continuous examination and refinement to define both its appropriateness and effectiveness. This report details the evolution of knowledge related to SVT and the historical evolution and controversies associated with Valsalva Manoeuvre (VM); it also highlights the ongoing development of an evidence-based model of practice for the management of SVT in the emergency medicine and prehospital emergency-care settings. A two-part review of the literature using electronic medical databases was conducted. Other relevant texts or articles unavailable within the electronic search were also identified. Part 1 of the search criteria identified the historical evolution of the pathophysiology of SVT, whereas part 2 identified the use of VM for the clinical management of SVT. Part 1 of the review identified a total of 38 articles with eight meeting the inclusion criteria, and part 2 of the review identified a total of 44 articles with 17 meeting the inclusion criteria. An evidence-based model of practice requires clarification. The differentiation of nodal re-entrant tachycardias may, with further research, lead to identification of the specificity of VM in reversion of SVT during the early stages of arrhythmia. There is a need for further prehospital and emergency department research to quantify an evidence-based approach to VM.


(Retrospective observational study)
BACKGROUND: This study was performed to determine the effects of sodium bicarbonate injection during prolonged cardiopulmonary resuscitation (for >15 minutes). METHODS: The retrospective cohort study consisted of adult patients who presented to the emergency department (ED) with the diagnosis of cardiac arrest in 2009. Data were retrieved from the institutional database. RESULTS: A total of 92 patients were enrolled in the study. Patients were divided into 2 groups based on whether they were treated (group 1, n = 30) or not treated (group 2, n = 62) with sodium bicarbonate. There were no significant differences in demographic characteristics between groups. The median time interval between the administration of CPR and sodium bicarbonate injection was 36.0 minutes (IQR: 30.5-41.8 minutes). The median amount of bicarbonate injection was 100.2 mEq (IQR: 66.8-104.4). Patients who received a sodium bicarbonate injection during prolonged CPR had a higher percentage of return of spontaneous circulation, but not statistical significant (ROSC, 40.0% vs. 32.3%; P = .465). Sustained ROSC was achieved by 2 (6.7%) patients in the sodium bicarbonate treatment group, with no survival to discharge. No significant differences in vital signs after ROSC were detected between the 2 groups.
(heart rate, P = .124; systolic blood pressure, P = .094). Sodium bicarbonate injection during prolonged CPR was not associated with ROSC after adjust for variables by regression analysis (Table 3; P = .615; odds ratio, 1.270; 95% confidence interval: 0.501-3.219) CONCLUSIONS: The administration of sodium bicarbonate during prolonged CPR did not significantly improve the rate of ROSC in out-of-hospital cardiac arrest.

Basic life support


Little is known about the hemodynamic effects of chest compression at different positions on the sternum during cardiopulmonary resuscitation (CPR). This study aimed to test whether external chest compression at the lower end of the sternum as an alternative position (alternative compression) results in superior hemodynamic effects compared to standard external chest compression (standard compression). We enrolled 17 patients with non-traumatic cardiac arrest who failed to regain spontaneous circulation within 30 min after CPR initiation. Standard compression was begun when cardiac arrest was confirmed. Alternative compression was performed for 2 min if spontaneous circulation was not attained after 30 min of standard CPR. We compared hemodynamics and end-tidal CO2 pressure during the last 2 min of standard compression and during alternative compression. Peak arterial pressure during compression systole (114 ± 51 vs. 95 ± 42 mm Hg, p < 0.001) and end-tidal CO2 pressure (11.0 ± 6.7 vs. 9.6 ± 6.9 mm Hg, p < 0.05) were higher with alternative than standard compression, whereas arterial pressure during compression diastole, peak right atrial pressure, and coronary perfusion pressure did not differ between standard and alternative compression. Compared to standard compression, alternative compression results in a higher peak arterial pressure and end-tidal CO2 pressure, but no change in coronary perfusion pressure.


A biomechanical analysis of the constant peak displacement and constant peak force methods of cardiopulmonary resuscitation (CPR) has revealed that optimal CC performance strongly depends on back support stiffness, CC rate, and the thoracic stiffness of the patient being resuscitated. Clinically the results presented in this study suggest that the stiffness of the back support surfaces found in many hospitals may be sub-optimal and that a backboard or a concrete floor can be used to enhance CC effectiveness. In addition, the choice of optimal CC rate and maximum sternal force applied by clinicians during peak force CPR is ought to be based on a general assessment of the patient’s thoracic stiffness, taking into account the patient's age, gender, and physical condition; which is consistent with current clinical practice. In addition, it is important for clinicians to note that very high peak sternal forces, exceeding the limit above which severe chest wall trauma and abdominal injury occurs, may be required for optimal CC during peak force CPR on patients with very stiff chests. In these cases an alternative CPR technique may be more appropriate.

Compared to Standard CPR. Circulation 2012; (Online first): 10.1161/circulationaha.112.124115

(Retrospective cohort)
Little is known about the long-term survival effects of type-specific bystander CPR in the community. We hypothesized that dispatcher instruction consisting of chest compression alone would be associated with better overall long-term prognosis compared to chest compression plus rescue breathing. METHODS AND RESULTS: The investigation was a retrospective cohort study that combined 2 randomized trials comparing the short-term survival effects of dispatcher CPR instruction consisting either of chest compression alone or chest compression plus rescue breathing. Long-term vital status was ascertained using the respective National and State death records through 31(st) July 2011. We performed Kaplan Meier method and Cox regression to evaluate survival according to the type of CPR instruction. Of the 2496 subjects included in the current investigation, 1243 (50%) were randomized to chest compression alone and 1253 (50%) were randomized to chest compression plus rescue breathing. Baseline characteristics were similar between the two CPR groups. During the 1153.2 person-years of follow-up, there were 2260 deaths and 236 long-term survivors. Randomization to chest compression alone compared to chest compression plus rescue breathing was associated with a lower risk of death after adjustment for potential confounders (adjusted HR=0.91; 95% CI [0.83-0.99], p=0.02). CONCLUSIONS: The findings provide strong support for long-term mortality benefit of dispatcher CPR instruction strategy consisting of chest compression alone rather than chest compression plus rescue breathing among adult cardiac arrest patients requiring dispatcher assistance.

Objective: Dispatch-assisted CPR instructions frequently direct bystanders to remove a cardiac arrest patient's clothing prior to starting chest compressions. Removing clothing may delay compressions and it is uncertain whether CPR quality is influenced by the presence of clothing. We measured how instructions to remove clothing impacted the time to compressions and CPR performance by lay responders in a simulated arrest.
Subjects and Methods: We conducted a randomized dispatch-assisted CPR simulation trial. Fifty-two lay participants were instructed to remove the manikin's clothing (3 layers: a t-shirt, button-down shirt, and fleece vest) prior to starting chest compressions as part of dispatcher instructions, while 47 individuals received no instruction about clothing removal. Instructions were otherwise identical. Results: The two groups were comparable with regard to demographic characteristics and prior CPR training. Time to first compression was 109 seconds among the group randomized to instruction to remove clothing and 79 seconds among those randomized to forgo instruction regarding clothing removal, (p < 0.001). Among those randomized to remove clothing instructions, mean compression depth was 41 mm, compression rate was 97 per minute, and the percentage with complete compression release was 95%. Among those randomized to forgo clothing removal instruction, mean compression depth was 40 mm, compression rate was 99 per minute, and the percentage with complete compression release was 91% (p > 0.05 for each CPR metric comparison). Conclusion: These findings suggest that eliminating instruction to remove a victim's clothing in dispatcher-assisted CPR will save time without compromising performance, which may improve survival from cardiac arrest.

(Prospective observational study)
It remains unclear which is more effective to increase survival after out-of-hospital cardiac arrest in those with public-access defibrillation, bystander-initiated chest compression-only cardiopulmonary resuscitation (CPR) or conventional CPR with rescue breathing. Methods and Results:
A nationwide, prospective, population-based observational study covering the whole population of Japan and involving consecutive out-of-hospital cardiac arrest patients with resuscitation attempts has been conducted since 2005. We enrolled all out-of-hospital cardiac arrests of presumed cardiac origin that were witnessed and received shocks with public-access automated external defibrillation (AEDs) by bystanders from January 1, 2005, to December 31, 2009. The main outcome measure was neurologically favorable 1-month survival. We compared outcomes by type of bystander-initiated CPR (chest compression-only CPR and conventional CPR with compressions and rescue breathing). Multivariable logistic regression was used to assess the relationship between the type of CPR and a better neurological outcome. During the 5 years, 1376 bystander-witnessed out-of-hospital cardiac arrests of cardiac origin in individuals who received CPR and shocks with public-access AEDs by bystanders were registered. Among them, 506 (36.8%) received chest compression-only CPR and 870 (63.2%) received conventional CPR. The chest compression-only CPR group (40.7%, 206 of 506) had a significantly higher rate of 1-month survival with favorable neurological outcome than the conventional CPR group (32.9%, 286 of 870; adjusted odds ratio, 1.33; 95% confidence interval, 1.03, 1.70). Conclusions: Compression-only CPR is more effective than conventional CPR for patients in whom out-of-hospital cardiac arrest is witnessed and shocked with public-access defibrillation. Compression-only CPR is the most likely scenario in which lay rescuers can witness a sudden collapse and use public-access AEDs.

Full text available for free at: http://circ.ahajournals.org/content/126/24/2844.full

(Mannequin study)
Objective: We aimed to compare the quality of chest compressions performed by inexperienced rescuers in different positions, notably supine and at a 30 degree inclined lateral position, to ascertain whether high-quality chest compression is feasible on a pregnant subject in cardiac arrest.
Subjects and methods: We performed a prospective, randomised crossover design study. Each participant performed 2-min chest compressions in two different positions on a mannequin: a supine position and a 30 degree left inclined lateral position. After 2 min of chest compression in one position, the participant took a rest for 10 min to minimise rescuer fatigue and then performed chest compression in the second position. Data on chest compression rate, mean chest compression depth, correct compression depth rate, correct recoil rate, and correct hand position rate were collected. To measure the angle between the rescuer's arm and the victim's chest surface, chest compressions were recorded with a video recorder. After each practice session, participants were asked to report the subjective difficulty of performing chest compressions using a visual analogue scale. Results: All 32 participants successfully completed the study. The mean compression rate and depth were 121.0 per minute and 53.3 mm in the supine position and 118.8 per minute and 52.0 mm in the inclined lateral position, respectively (p = 0.978 and p = 0.260, respectively). Also, there were no differences in the correct compression depth rate, the correct hand position rate, or the correct recoil rate (p = 0.426, p = 0.467, and p = 0.260, respectively). However, the lowest and highest angles and the subjective difficulty of chest compression differed significantly (p < 0.001, p < 0.001, and p = 0.007, respectively). Conclusions: Inexperienced rescuers appear to be capable of performing high-quality chest compressions in a 30 degree inclined lateral position on pregnant women in a simulated cardiac arrest state.

(Prospective observational study)
Background: Little is known about the nationwide trend in the survival of out-of-hospital cardiac arrest (OHCA) in Japan and the differences in
incidence and survival by age group and origin of arrest. Methods and Results: A nationwide, prospective, population-based observation covering the whole population of Japan and involving consecutive OHCA patients with resuscitation attempts was conducted from January 2005 to December 2009. The main outcome measure was 1-month survival with favorable neurological outcome. The nationwide trends in OHCA incidence and outcome by age and origin of arrest were assessed. Multiple logistic regression analysis for bystander-witnessed OHCA was used to adjust for factors that were potentially associated with favorable neurological outcome. During 5 years, 547,153 overall OHCA and 169,360 bystander-witnessed OHCA were enrolled. The annual incidence significantly increased among overall OHCA and bystander-witnessed OHCA. Neurologically favorable survival significantly increased from 1.6% (1676/102,737) in 2005 to 2.8% (3280/115,250) in 2009 (P<0.001), from 2.1% (638/30,556) to 4.3% (1558/36,361) (P<0.001), and from 9.8% (437/4461) to 20.6% (1215/5906) (P<0.001) among overall OHCA, bystander-witnessed OHCA, and bystander-witnessed ventricular fibrillation OHCA, respectively. Public-access automated external defibrillator use, either bystander-initiated chest compression-only cardiopulmonary resuscitation or conventional cardiopulmonary resuscitation, and earlier emergency medical services response time were associated with a better neurological outcome. Favorable neurological outcome among adult OHCA subjects significantly improved, but the outcome among younger children and very elderly subjects did not improve and was poor irrespective of origin of OHCA. Conclusions: Nationwide improvements of favorable neurological outcome from OHCA were observed in Japan and differed by age group and origin of OHCA.

(Animal study)

The aim of the study was to assess the effects of positioning the head on a support on “head position angles” to optimally open the upper airway during bag-valve mask ventilation. Methods: We ventilated the lungs of anesthetized adults with a bag-valve mask and the head positioned with (n = 30) or without a support (n = 30). In both groups, head position angles and ventilation parameters were measured with the head positioned in (1) neutral position, (2) in a position deemed optimal for ventilation by the investigator, and (3) in maximal extension. Results: Between groups (“head with/without a support”) and between head positions within each group, head position angles and ventilation parameters differed (P < .0001, respectively). However, head position angles and ventilation parameters between head positions differed less “with a support” (P < .001), and ventilation parameters improved with a support compared with the head-without-a-support group (P < .001). Conclusions: In the head-with-a-support group, when compared with the head-without-a-support group, head position angles differed less, indicating a decreased potential for failure during bag-valve mask ventilation with the head on a support. Moreover, in the head-with-a-support group, ventilation parameters differed less between head positions, and ventilation improved. These findings suggest a potential benefit of positioning the head on a support during bag-valve mask ventilation.

Education, implementation and teams

OBJECTIVE: To assess the practices and opinions of prehospital emergency medical services (EMS) with regard to family witnessed resuscitation (FWR) and to analyse the differences between physicians' and nurses' responses. DESIGN: An anonymous questionnaire (30 yes/no questions on
demographics and FWR) was sent to all prehospital emergency staff (physicians, nurses and support staff) working for the 377 Mobile Intensive Care Units in France. RESULTS: Of the 2689 responses received 2664 were analysed. Mean respondent age was 38 +/- 8 years, the male to female ratio was 1:2. 87% of respondents had already performed FWR and 38% had offered relatives the option to be present during resuscitation. Most respondents (90%) felt that FWR might cause psychological trauma to the family; 70% thought that FWR might impact on the duration of resuscitation and 68% on EMS team concentration. In the 28% of cases when relatives had asked to be present, 59% of respondents had acquiesced but only 27% were willing to invite relatives to be routinely present. CONCLUSIONS: Prehospital EMS teams in France seems to support FWR but are not yet ready to offer it systematically to relatives. Following our survey, written guidelines are currently in development in our department. These guidelines could be the first step of a national strategy for developing FWR in France. We await results from other studies of family members' opinions to compare prehospital practitioners' and family members' views to further develop our practice.

(Retrospective observational study)
It is unclear whether the basic life support (BLS) and advanced life support (ALS) pre-hospital termination of resuscitation (TOR) rules developed in North America can be applied successfully to patients with out-of-hospital cardiac arrest (OHCA) in other countries. Objectives: To assess the performance of the BLS and ALS TOR in Japan. Methods: Retrospective nationwide, population-based, observational cohort study of consecutive OHCA patients with emergency responder resuscitation attempts from 1 January 2005 to 31 December 2009 in Japan. The BLS TOR rule has 3 criteria whereas the ALS TOR rule includes 2 additional criteria. We extracted OHCA patients meeting all criteria for each TOR rule, and calculated the specificity and positive predictive value (PPV) of each TOR rule for identifying OHCA patients who did not have neurologically favorable one-month survival. Results: During the study-period, 151,152 cases were available to evaluate the BLS TOR rule, and 137,986 cases to evaluate the ALS TOR rule. Of 113,140 patients that satisfied all three criteria for the BLS TOR rule, 193 (0.2%) had a neurologically favorable one-month survival. The specificity of BLS TOR rule was 0.968 (95% CI: 0.963, 0.972), and the PPV was 0.998 (95% CI: 0.998, 0.999) for predicting lack of neurologically favorable one-month survival. Of 41,030 patients that satisfied all five criteria for the ALS TOR rule, just 37 (0.1%) had a neurologically favorable one-month survival. The specificity of ALS TOR rule was 0.981 (95% CI: 0.973, 0.986), and the PPV was 0.999 (95% CI: 0.998, 0.999) for predicting lack of neurologically favorable one-month survival. Conclusions: The prehospital BLS and ALS TOR rules performed well in Japan with high specificity and PPV for predicting lack of neurologically favorable one-month survival in Japan. However, the specificity and PPV were not 100.0 and we have to develop more specific TOR rules.

(Randomised trial)
The optimal strategy to retrain basic life support (BLS) skills on a manikin is unknown. We analysed the differential impact of a video (video group, VG), voice feedback (VFG), or a serial combination of both (combined group, CG) on BLS skills in a self-learning (SL) environment. Methods: Two hundred and thirteen medicine students were randomly assigned to a VG, a VFG and a CG. The VG refreshed the skills with a practice-while-watching video (abbreviated Mini Anne video, Laerdal, Norway) and a manikin, the VFG with a computer-guided manikin (Resusci Anne Skills Station, Laerdal, Norway) and the CG with a serial combination of both. Each student performed two sequences of 60 compressions, 12 ventilations
and three complete cycles of BLS (30:2). The proportions of students achieving adequate skills were analysed using generalised estimating equations analysis, taking into account pre-test results and training strategy. Results: Complete datasets were obtained from 192 students (60 VG, 69 VFG and 63 CG). Before and after training, ≥70% of compressions with depth ≥50 mm were achieved by 14/60 (23%) vs. 16/60 (27%) VG, 24/69 (35%) vs. 50/69 (73%) VFG and 19/63 (30%) vs. 41/63 (65%) CG (P < 0.001). Compression rate 100–120/min was present in 27/60 (45%) vs. 52/60 (87%) VG, 28/69 (41%) vs. 44/69 (64%) VFG and 27/63 (43%) vs. 42/63 (67%) CG (P = 0.05). Achievement of ≥70% ventilations with a volume 400–1000 ml was present in 29/60 (49%) vs. 32/60 (53%) VG, 32/69 (46%) vs. 52/69 (75%) VFG and 25/63 (40%) vs. 51/63 (81%) CG (P = 0.001). There was no between-groups difference for complete release.

Conclusions: Voice feedback and a sequential combination of video and voice feedback are both effective strategies to refresh BLS skills in a SL station. Video training alone only improved compression rate. None of the three strategies resulted in an improvement of complete release.

(Systematic review)
Training schoolchildren to perform cardiopulmonary resuscitation is one possible method of increasing bystander CPR rates. We reviewed available literature to identify what methods of training children have been successful. We reviewed available literature to identify what methods of training children have been successful. Objectives and methods This review sought to evaluate evidence addressing the following PICO question: (P) In schoolchildren, (I) what types of CPR, AED and first aid training (C) when compared to no training and to each other (O) lead to ability to perform life saving measures? Searches were conducted in Ovid MEDLINE (1946 - August 2012), Ovid EMBASE (1974 - August 2012) and Ebscohost Cinahl (1981 - August 2012). Database specific subject headings in all three databases (MeSH in MEDLINE, Emtree in EMBASE, Cinahl Headings) were selected for the concepts of cardiopulmonary resuscitation (CPR) and education. The combined results were then limited by age to include all school aged children. The search yielded 2620 articles. From titles, abstract and key words, 208 articles described CPR, AED and/or first aid training in schoolchildren and were eligible for review. These were obtained in full, were unavailable or not published in English. We reviewed articles for publication type and relevance. 48 studies were identified. One additional study was included as an extension of a study retrieved within the search. Results: The studies found by the search were heterogeneous for study and training methodology. Findings regarding schoolchild age and physical factors, the role of practical training, use of self-instruction kits, use of computer based learning, reduced training time, trainer type, AED training are presented.

Conclusions: Evidence shows that cardiopulmonary training, delivered in various ways, is successful in a wide age range of children. While older children perform more successfully on testing, younger children are able to perform basic tasks well, including use of AEDs. Chest compression depth correlates with physical factors such as increasing weight, BMI and height. Instruction must include hands on practice to enable children to perform physical tasks. Repeated training improves performance and retention but the format and frequency of repeated training is yet to be fully determined. Types of training that may reduce the main obstacles to implementation of such training in schools include use of self-instruction kits, computer based learning and use of teacher and peer tutor trainers, but again, need further exploration. As starting points we recommend legislative and funded mandates to provide such training to schoolchildren, and production and use of a framework which will delineate longitudinal delivery of training over the school career. Further research should have some uniformity in terms of assessment methodology, look at longer outcomes, and ideally will evaluate areas that are currently poorly defined.

Prehosp Emerg Care 2013; 17 (1): 57-67

Objective. The aim of this study was to develop and critically appraise a global rating scale (GRS) for the assessment of individual paramedic clinical competence at the entry-to-practice level. Methods. The development phase of this study involved task analysis by experts, contributions from a focus group, and a modified Delphi process using a national expert panel to establish evidence of content validity. The critical appraisal phase had two raters apply the GRS, developed in the first phase, to a series of sample performances from three groups: novice paramedic students (group 1), paramedic students at the entry-to-practice level (group 2), and experienced paramedics (group 3). Using data from this process, we examined the tool's reliability within each group and tested the discriminative validity hypothesis that higher scores would be associated with higher levels of training and experience. Results. The development phase resulted in a seven-dimension, seven-point adjectival GRS. The two independent blinded raters scored 81 recorded sample performances (n = 25 in group 1, n = 33 in group 2, n = 23 in group 3) using the GRS. For groups 1, 2, and 3, respectively, interrater reliability reached 0.75, 0.88, and 0.94. Intra-rater reliability reached 0.94 and the internal consistency ranged from 0.53 to 0.89. Rater differences contributed 0–5.7% of the total variance. The GRS scores assigned to each group increased with level of experience, both using the overall rating (means = 2.3, 4.1, 5.0; p < 0.001) and considering each dimension separately. Applying a modified borderline group method, 54.9% of group 1, 13.4% of group 2, and 2.9% of group 3 were below the cut score. Conclusion. The results of this study provide evidence that the scores generated using this scale can be valid for the purpose of making decisions regarding paramedic clinical competence.

Paediatric advanced life support

(Retrospective observational study)
Background: Despite ongoing efforts to improve the quality of pediatric resuscitation, it remains unknown whether survival in children with in-hospital cardiac arrest has improved. Methods and Results: Between 2000 and 2009, we identified children (<18 years of age) with an in-hospital cardiac arrest at hospitals with > 3 years of participation and > 5 cases annually within the national Get With The Guidelines - Resuscitation registry. Multivariable logistic regression was used to examine temporal trends in survival to discharge. We also explored whether trends in survival were attributable to improvement in acute resuscitation or postresuscitation care and examined trends in neurological disability among survivors. Among 1031 children at 12 hospitals, the initial cardiac arrest rhythm was asystole and pulseless electrical activity in 874 children (84.8%) and ventricular fibrillation and pulseless ventricular tachycardia in 157 children (15.2%), with an increase in cardiac arrests due to pulseless electrical activity over time (P for trend <0.001). Risk-adjusted rates of survival to discharge increased from 14.3% in 2000 to 43.4% in 2009 (adjusted rate ratio per year, ANZCOR Research updates December 2012
1.08; 95% confidence interval, 1.01, 1.16; P for trend=0.02). Improvement in survival was driven largely by an improvement in acute resuscitation survival (risk-adjusted rates: 42.9% in 2000, 81.2% in 2009; adjusted rate ratio per year: 1.04; 95% confidence interval, 1.01, 1.08; P for trend=0.006). Moreover, survival trends were not accompanied by higher rates of neurological disability among survivors over time (unadjusted P for trend=0.32), suggesting an overall increase in the number of survivors without neurological disability over time. Conclusion: Rates of survival to hospital discharge in children with in-hospital cardiac arrests have improved over the past decade without higher rates of neurological disability among survivors.

Full text available for free at: http://circoutcomes.ahajournals.org/content/early/2012/12/18/CIRCOUTCOMES.112.967968.full.pdf+

(Cross-sectional observational study)
Objective: Children treated with neonatal extracorporeal membrane oxygenation may show physical and mental morbidity at a later age. We compared the health-related quality of life of these children with normative data. Design: Prospective longitudinal follow-up study. Setting: Outpatient clinic of a level III university hospital. Patients: Ninety-five 5-yr-old children who had received neonatal extracorporeal membrane oxygenation support between January 1999 and December 2005. Interventions: None. Measurements and Main Results: The pediatric quality of life inventory was administered at 5 yrs of age. The mothers (n = 74) as proxy-reporters assigned significantly lower health-related quality of life scores for their children than did the parents in the healthy reference group for the total functioning scale of the pediatric quality of life inventory (mean difference: 8.1; p < 0.001). Mothers' scores for 31 children (42%) were indicative of impaired health-related quality of life (>=-1 SD below the reference norm). The children (n = 78) themselves scored significantly lower than did their healthy peers on total functioning (mean difference: 11.0; p < 0.001). Thirty-two children (41%) indicated an impaired health-related quality of life themselves. For the mother proxy-reports, the duration of extracorporeal membrane oxygenation support (R2 = 0.009; p = 0.010) and the presence of chronic lung disease (R2 = 0.133; p = 0.002) were negatively related to total functioning. Children with a disabled health status for neuro-motor functioning, maximum exercise capacity, behavior, and cognitive functioning at 5 yrs of age had a higher odds ratio of also having a lower health-related quality of life. Health status had no influence on reported emotional functioning. Conclusions: Overall, children treated with extracorporeal membrane oxygenation in the neonatal period reported low health-related quality of life at 5 yrs of age. Because only emotional health-related quality of life was not associated with health status, the pediatric quality of life inventory might be a measure of health status rather than of health-related quality of life. In contrast with conclusions from others, we found that 5-yr-old children might be too young to rate their own health-related quality of life.

We have previously reported the use of EC-CPR for the treatment of hypothermic cardiac arrest with an overall survival of 50%. As we have continued this protocol for an additional 5 years, we sought to update this information. METHODS: We reviewed all of the activations for hypothermic cardiac arrest from 2005 to 2011. Results are presented as means with minimum and maximum values. The 95% confidence interval for the point estimate of survival was calculated using a binomial distribution. RESULTS: Nine children were placed on EC-CPR for hypothermic cardiac arrest. Two patients survived to discharge and were neurologically normal. The other seven patients were adequately supported with veno-arterial EC-CPR but met brain death criteria after rewarming prompting withdrawal of support. Four of these went on to multiple organ donation. The
overall survival in the series was 22% with a 95% confidence interval from 4% to 58%. CONCLUSION: Cold water drowning and avalanche suffocations cause dramatic hypothermic cardiac arrests in previously robust children. A protocolized rapid response with EC-CPR can save some of these children despite prolonged periods of cardiac arrest prior to initiation of bypass. The overall survival rate is likely less than our prior more optimistic report suggested.

Resuscitation of the newborn


(Review)
Despite advances in the understanding of fetal and neonatal physiology and the technology to monitor and treat premature and full-term neonates, little has changed in resuscitation rooms. The authors' vision for the Fetal and Neonatal Resuscitation and Transition Suite of the future is marked by improvements in the amount of physical space, monitoring technologies, portable diagnostic and therapeutic technologies, communication systems, and capabilities and training of the resuscitation team. Human factors analysis will play an important role in the design and testing of the improvements for safe, effective, and efficient resuscitation of the newborn.


(Retrospective observational study)
Objective: To study the time needed to obtain a reliable, functioning pulse oximeter signal during the resuscitation of very low birth weight (VLBW) infants. Methods: This is a retrospective review of data from the resuscitation of preterm, VLBW infants at the University of California, San Diego Medical Center. Resuscitation teams consisted of a neonatal physician, a nurse, and respiratory therapist. Pulse oximetry was routinely used in all preterm deliveries. During resuscitation, the respiratory therapist attempted to place a pulse oximeter probe on the right hand or wrist immediately after birth. The BioPAC MP-150 Data Acquisition System was used to record analog data during the resuscitation, including the SpO2 value. From the analog tracing, the time at which a reliable pulse oximetry signal was obtained was determined. Results: 50 VLBW (≤1500 g) preterm patients were studied. Mean gestational age was 27 + 4 weeks (range: 23–35 weeks). Mean birth weight was 920 ± 287 g (range: 360–1445 g). Mean time to achieve functioning pulse oximetry was 79 ± 42 s (range: 40–240 s). The median time was 67 s (interquartile range: 50–93 s). 86% of infants had a reliable SpO2 value obtained prior to 120 s of life. Conclusions: Our data show that an experienced respiratory therapist can apply a pulse oximeter and achieve reliable SpO2 values for the majority VLBW infants by 120 s of life as recommended by current NRP guidelines.


OBJECTIVE: To determine whether presenting delivery room management options as defaults influences decisions to resuscitate extremely premature infants. MATERIALS AND METHODS: Adult volunteers recruited from the world wide web were randomised to receive either resuscitation or comfort care as the delivery room management default option for a hypothetical delivery of a 23-week gestation infant. Participants
were required to check a box to opt out of the default. The primary outcome measure was the proportion of respondents electing resuscitation. Data were analysed using chi^{2} tests and multivariate logistic regression. RESULTS: Participants who were told the delivery room management default option was resuscitation were more likely to opt for resuscitation (OR 6.54 95% CI 3.85 to 11.11, p<0.001). This effect persisted on multivariate regression analysis (OR 7.00, 95% CI 3.97 to 12.36, p<0.001). Female gender, being married or in a committed relationship, being highly religious, experiences with prematurity, and favouring sanctity of life were significantly associated with decisions to resuscitate. DISCUSSION: Presenting delivery room options for extremely premature infants as defaults exert a significant effect on decision makers. The information structure of the choice task may act as a subtle form of manipulation. Further, this effect may operate in ways that a decision maker is not aware of and this raises questions of patient autonomy. CONCLUSION: Presenting delivery room options for extremely premature infants as defaults may compromise autonomous decision-making.

(Retrospective observational study)
Positive pressure ventilation (PPV) is provided by manual ventilation devices such as self-inflating bags (SIB), flow inflating bags and T-piece resuscitators. The objective of this study is to compare the effect of type of manual ventilation device on overall response to resuscitation among preterm neonates born < 35 weeks gestation. METHODS. Retrospective data were collected in 2 time periods. Primary outcome was overall response to resuscitation as measured by Apgar score. Secondary outcomes were incidence of airleaks, need for chest compressions/epinephrine, need for intubation and surfactant use. RESULTS. 294 resuscitations requiring PPV were identified. 135 neonates had SIB used and 159 neonates had T-piece used to provide PPV. There was no significant difference in 1 and 5 minute Apgar scores between devices (P=0.770, P=0.105 respectively) nor were there significant differences in secondary outcomes. The rate of rise of Apgar scores was higher by 0.47 for the T-piece compared to the SIB (95%CI=0.08, 0.87, P=0.019) CONCLUSION. Although some manikin studies favor the T piece device in providing reliable and consistent pressures, our experience did not indicate significant differences in effectiveness of resuscitation between the T piece and SIB in preterm resuscitations.

(Review)
Despite advances in neonatal care, the rate of oxygen dependence at 36 weeks' postmenstrual age or bronchopulmonary dysplasia has not fallen. Neonatologists are increasingly careful to apply ventilation strategies that are gentle to the lung in the neonatal intensive care unit. However, there has not been the same emphasis applying gentle ventilation strategies immediately after birth. A lung-protective strategy should start immediately after birth to establish a functional residual capacity, reduce volutrauma and atelectotrauma, facilitate gas exchange, and improve oxygenation during neonatal transition. This article discusses techniques and equipment recommended by international resuscitation guidelines during breathing assistance in the delivery room.


ANZCOR Research updates December 2012
Tracheal intubation remains a common procedure during neonatal intensive care. Rapid confirmation of correct tube placement is important because tube malposition is associated with serious adverse outcomes. The current gold standard test to confirm tube position is a chest radiograph, however this is often delayed until after ventilation has commenced. Hence, point of care methods to confirm correct tube placement have been developed. The aim of this article is to review the available literature on tube placement in newborn infants. We reviewed books, resuscitation manuals and articles from 1830 to the present with the search terms “Infant, Newborn”, “Endotracheal intubation”, “Resuscitation”, “Clinical signs”, “Radiography”, “Respiratory Function Tests”, “Laryngoscopy”, “Ultrasonography”, and “Bronchoscopy”. Various techniques have been studied to help clinicians assess tube placement. However, despite 85 years of clinical practice, the search for higher success rates and quicker intubation continues. Currently, chest radiography remains the gold standard test to confirm tube position. However, rigorous evaluation of new techniques is required to ensure the safety of newborn infants.

Acute coronary syndromes

(Retrospective observational study)
This study sought to compare the 1-year survival of patients diagnosed with ST-segment elevation myocardial infarction (STEMI) and transferred via pre-hospital triage strategy for primary percutaneous coronary intervention (PCI) with those transferred via inter-hospital transfer within a large suburban region in Canada. Background: Primary angioplasty is the preferred therapy for STEMI if it is done within 90 min of door-to-balloon time by an experienced team in a high-volume center. Methods Patients identified to have STEMI on the ambulances equipped with electrocardiography bypassed the local hospitals and were sent directly to the PCI center, whereas other patients that were picked up by ambulances without electrocardiographic equipment were transported to the local hospitals where the diagnosis of STEMI was made and were re-routed to the PCI center. Patient demographic data, clinical presentation, procedural data, in-hospital course, and vital statistics were prospectively recorded in a provincial cardiac registry. Results: A total of 167 patients were brought into the PCI center via pre-hospital triage strategy, and 427 patients were brought in via inter-hospital transfer during a 2-year study period. Baseline demographic data, infarct location, cardiovascular history, and hemodynamic status were similar between the 2 groups. When compared with the inter-hospital transfer group, a significantly higher proportion of pre-hospital triaged patients achieved the 90-min door-to-balloon time benchmark (80.4% vs. 8.7%, p < 0.001) and post-procedural Thrombolysis In Myocardial Infarction flow grade 3 after the emergency procedure (97.6% vs. 91.4%, p = 0.02). In addition, the pre-hospital triage strategy was associated with a significantly lower 30-day (5.4% vs. 13.3%, p = 0.006) and 1-year (6.6% vs. 17.5%, p = 0.019) mortality. Pre-hospital triage was an independent predictor for survival at 1 year (hazard ratio: 0.37, 95% confidence interval: 0.18 to 0.75, p = 0.006). Conclusions: Pre-hospital triage strategy was associated with improved survival rate in patients undergoing primary PCI in a regional STEMI program.
(Review)
As major prescribers of oral anticoagulants, cardiologists must be familiar with strategies to manage bleeding, the principal complication associated with all anticoagulants, and to reverse anticoagulant effects in acute-care settings. The purpose of this manuscript is to review currently available information regarding dabigatran and rivaroxaban, the 2 novel oral anticoagulants approved to date in the United States. Further, we suggest reasonable interventions for the clinician faced with a patient who suffers a major bleeding event while receiving one of these agents. Data sources were peer-reviewed publications, US Food and Drug Administration documents in the public domain, and approved US prescribing information for dabigatran (Pradaxa) and rivaroxaban (Xarelto). Strategies for management of bleeding and reversal of anticoagulant effects from warfarin include vitamin K, fresh frozen plasma, and prothrombin complex concentrates. For rivaroxaban and dabigatran, appropriate therapies include support and observation, which are likely to be effective for the majority of patients because of the short half-lives of these agents. In severe life-threatening hemorrhage, clotting-factor substitutes may be appropriate in certain situations. Validated protocols specific to each agent remain to be developed.

(Retrospective observational study)
BACKGROUND: Risk stratification of the early repolarization pattern (ERP) is needed to identify malignant early repolarization. J-point elevation with a horizontal ST segment was recently suggested as a malignant feature of the ERP. In this study, the prevalence of the ERP with a horizontal ST segment was examined among survivors of sudden cardiac arrest (SCA) without structural heart disease to evaluate the value of ST-segment morphology in risk stratification of the ERP. METHODS: We reviewed the data of 83 survivors of SCA who were admitted from August 2005 to August 2010. Among them, 25 subjects without structural heart disease were included. The control group comprised 60 healthy subjects who visited our health promotion center; all control subjects were matched for age, sex, and underlying disease (diabetes mellitus, hypertension). Early repolarization was defined as an elevation of the J point of at least 0.1 mV above the baseline in at least two continuous inferior or lateral leads that manifested as QRS slurring or notching. An ST-segment pattern of <0.1 mV within 100 ms after the J point was defined as a horizontal ST segment. RESULTS: The SCA group included 17 men (64%) with a mean age of 49.7 +/- 14.5 years. The corrected QTc was not significantly different between the SCA and control groups (432.7 +/- 37.96 vs. 420.4 +/- 26.3, respectively; p = 0.089). The prevalence of ERP was not statistically different between the SCA and control groups (5/25, 20% vs. 4/60, 6.7%, respectively; p = 0.116). The prevalence of early repolarization with a horizontal ST segment was more frequent in the SCA than in the control group (20% vs. 3.3%, respectively; p = 0.021). Four SCA subjects (16%) and one control subject (1.7%) had a J-point elevation of >2 mm (p = 0.025). Four SCA subjects (16%) and one (1.7%) control subject had an ERP in the inferior lead (p = 0.025). CONCLUSION: The prevalence of ERP with a horizontal ST segment was higher in patients with aborted SCA than in matched controls. This result suggests that ST morphology has value in the recognition of malignant early repolarization.

This document has been developed as an Expert Consensus Document (ECD) by the American College of Cardiology Foundation (ACCF), American Association for Clinical Chemistry (AACC), American College of Chest Physicians (ACCP), American College of Emergency Physicians (ACEP), American College of Physicians (ACP), American Heart Association (AHA), and Society for Cardiovascular Angiography and Interventions (SCAI). Expert Consensus Documents are intended to inform practitioners, payers, and other interested parties of the opinion of ACCF and document cosponsors concerning the evolving areas of clinical practice and/or technologies that are widely available or new to the practice community. Topics chosen for coverage by ECDs are so designed because the evidence base, the experience with technology, and/or clinical practice are not considered sufficiently well developed to be evaluated by the formal ACCF/AHA Practice Guidelines process. Often the topic is the subject of considerable ongoing investigation. Thus, the reader should view the ECD as the best attempt of the ACCF and document cosponsors to inform and guide clinical practice in areas where rigorous evidence may not yet be available or evidence to date is not widely applied to clinical practice. When feasible, ECDs include indications or contraindications. Some topics covered by ECDs will be addressed subsequently by the ACCF/AHA Practice Guidelines Committee.


Swift assessment of patients presenting with chest pain results in faster treatment and improved outcomes. Allowing ambulance crews to use point-of-care (POC) devices to measure cardiac troponin I levels during transport of patients to the emergency department (ED) may result in earlier diagnosis of acute myocardial infarction, particularly in those patients without ST-segment elevation. The ability of POC devices to measure cardiac troponin I levels reliably in a moving ambulance has not previously been tested. Objective. This study was conducted to determine whether POC devices operated in a moving ambulance reliably duplicate the measurement of cardiac troponin I levels obtained by POC devices in the ED.

Methods. Blood samples were obtained in the ED and the hospital from patients reporting chest pain or other cardiac complaints. Troponin I assays were then performed in a moving ambulance using two POC devices. The POC devices were placed on flat surfaces in the rear of the ambulance. The ambulance driver was instructed to keep the ambulance moving in traffic while each assay was completed. A variety of routes were taken. Each set of two assays was completed entirely during a single simulated run. The results of the two assays performed in the moving ambulance were then compared with the results of the control assay, which was performed simultaneously in the ED on the same sample. Results. Forty-two whole-blood samples underwent troponin I assays in a moving ambulance. Thirteen (30.9%) assays were positive. One (2.4%) was excluded because of cartridge error. Two (4.8%) were excluded because of interfering substance. No significant difference in whole-blood troponin results was found between the assays performed in the moving ambulance and those performed in the ED (intraclass correlation coefficient 0.997; 95% confidence interval 0.994 to 0.998; p < 0.005). Conclusions. When used in a moving ambulance, the POC device provided results of cardiac troponin I assays that were highly correlated to the results when the device was used in the ED. The feasibility, practicality, and clinical utility of prehospital use of POC devices must still be assessed.

General papers

Unexplained cardiac arrest is defined as a cardiac arrest in the absence of coronary artery disease and overt structural heart disease, present in 5%-10% of cardiac arrest survivors. A genetic contribution to cardiac arrest is more common in this population, most commonly attributed to an inherited ion channel abnormality leading to familial syncope and sudden death. The common causes are Long QT and Brugada syndrome, catecholaminergic ventricular tachycardia, idiopathic ventricular fibrillation, and early repolarization syndrome. Latent structural causes include inherited cardiomyopathy such as arrhythmogenic right ventricular cardiomyopathy. We review these causes in detail and a structured approach to the investigation of these patients, which provides a diagnosis in approximately half of these patients. This allows for the initiation of disease-specific treatments and enables family screening.


Background: Recent studies have suggested gender differences in out-of-hospital cardiac arrests (OHCA) including outcomes favouring young women. We aimed to investigate these findings in an Australian OHCA population using the Victorian Ambulance Cardiac Arrest Registry (VACAR).

Methods and results: The VACAR was searched for adult presumed cardiac OHCA between 2003 and 2010 where Emergency Medical Services attempted resuscitation. Gender and age differences in survival to hospital arrival and to hospital discharge were examined using logistic regression adjusting for known predictors of survival. There were 10,453 OHCA meeting inclusion criteria (863 aged between 18 and 44 years). Women were less likely to be younger, have a witnessed arrest, receive bystander CPR, arrest in a public place, have an initial shockable rhythm or receive transport to 24-h cardiac interventional hospital. After adjusting for differences in pre-hospital factors, women were more likely to survive to hospital arrival than men (aOR 3.47, 95% CI: 2.19, 5.50), but no gender differences were seen in survival to hospital discharge either overall or specifically in women aged between 18 and 44 years. Both younger men and younger women were more likely to survive to hospital discharge compared to older men and women. Conclusion: Women were more likely to survive to hospital arrival despite less favourable baseline variables. However, this initial improvement in survival did not translate to better survival to hospital discharge either overall, or in women of a reproductive age. Further study is required to determine gender differences in the underlying causes of OHCA and in EMS transportation practices.


In this article, we describe how to include considerations about resource utilization when making recommendations according to the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach. We focus on challenges with rating the confidence in effect estimates (quality of evidence) and incorporating resource use into evidence profiles and Summary of Findings (SoF) tables. GRADE recommends that important differences in resource use between alternative management strategies should be included along with other important outcomes in the evidence profile and SoF table. Key steps in considering resources in making recommendations with GRADE are the identification of items of resource use that may differ between alternative management strategies and that are potentially important to decision makers, finding evidence for the differences in resource use, making judgments regarding confidence in effect estimates using the same criteria used for health outcomes, and
valuing the resource use in terms of costs for the specific setting for which recommendations are being made. With our framework, decision makers will have access to concise summaries of recommendations, including ratings of the quality of economic evidence, and better understand the implications for clinical decision making.

(Randomised, controlled trial)
Most of the fractures and dislocations are reduced in the emergency setting. Many drugs are available for procedural sedation and analgesia in the emergency department (ED); however, the adverse effects are still a common problem. The aim of our study was to compare the 2 drug combinations. We performed a prospective, randomized, double-blinded, placebo-controlled trial of patients presenting to the ED after a traumatic event and required urgent reduction either for a fracture or dislocation. Patients were randomized to midazolam-fentanyl (MF) group or ketamine - low-dose midazolam (KM) group. Hypoxia, duration of hypoxia, need for oxygen, time to onset of sedation, recovery time, pain scores during reduction, and sedation depth were set as primary outcome measures and were recorded. A total of 498 patients who presented to ED with extremity injury and required closed reduction were assessed; 130 of them were approached for eligibility and 69 patients were excluded. The remaining 61 patients were randomized to either KM group (n = 31) or MF group (n = 30). Hypoxia and duration of hypoxia were significantly lower in the KM group compared with the MF group. Patients in the KM group reported significantly lower pain scores during reduction; however, adverse effects were higher compared with MF group. Both drug combinations can be effectively used for procedural sedation and analgesia; however, with lower risk for hypoxia and lower pain scores, KM combination stands as a reasonable choice for orthopedic interventions in the emergency unit.

(Retrospective observational study)
Intravenous (IV) line placement is an important prehospital advanced life support skill, but IV success rates are variable among providers. Little is known about what factors are associated with successful IV placement, limiting the ability to develop benchmarks for skill maintenance, such as requiring a specific number of IV placements per year. Objective. We aimed to identify whether first-pass IV success was associated with the number of attempted or successful previous IV attempts. We hypothesized that IV success is associated with the number of successful IV placements in the preceding year. Methods. We retrospectively studied 800 consecutive charts with an IV attempt from 11 suburban and rural emergency medical services (EMS) agencies over a one-month period. Cases involving pediatric patients (age <18 years) and those with incomplete data were excluded. Success of the first IV attempt was identified. Potential predictor variables were collected and analyzed by univariate logistic regression, including patient age, systolic blood pressure, history of IV drug abuse or renal disease, traumatic event, catheter size, and location of IV attempt, as well as the individual provider's numbers of total and successful IV attempts in the preceding year. Variables significantly associated with IV success at the p < 0.10 level were included in a multivariate regression model using a p-value of 0.05. Results. Of 602 cases meeting the study criteria, 469 (77.9%) had a successful first-pass IV placement. Significantly associated with IV success in the univariate regression were patient age (p = 0.054), trauma (p = 0.074), IV catheter size (p < 0.001), IV location (p = 0.056), and the number of previous successful IV attempts (p = 0.039), whereas the number of total previous IV attempts was not significantly associated (p = 0.871). In the multivariate logistic regression model, only IV catheter size had a significant association (p < 0.001), with a larger-bore IV catheter size associated
with higher success. Conclusion. In this retrospective study, larger IV catheter size, but not the prehospital providers’ previous year's experience, was associated with successful IV placement in adult patients. These data fail to support requirements for a minimum number of yearly IV placements by full-time paramedics to improve success rates.

GRADE requires guideline developers to make an overall rating of confidence in estimates of effect (quality of evidence - high, moderate, low, or very low) for each important or critical outcome. GRADE suggests, for each outcome, the initial separate consideration of five domains of reasons for rating down the confidence in effect estimates, thereby allowing systematic review authors and guideline developers to arrive at an outcome-specific rating of confidence. Although this rating system represents discrete steps on an ordinal scale, it is helpful to view confidence in estimates as a continuum, and the final rating of confidence may differ from that suggested by separate consideration of each domain. An overall rating of confidence in estimates of effect is only relevant in settings when recommendations are being made. In general, it is based on the critical outcome that provides the lowest confidence.

Summary of Findings (SoF) tables present, for each of the seven (or fewer) most important outcomes, the following: the number of studies and number of participants; the confidence in effect estimates (quality of evidence); and the best estimates of relative and absolute effects. Potentially challenging choices in preparing SoF table include using direct evidence (which may have very few events) or indirect evidence (from a surrogate) as the best evidence for a treatment effect. If a surrogate is chosen, it must be labeled as substituting for the corresponding patient-important outcome. Another such choice is presenting evidence from low-quality randomized trials or high-quality observational studies. When in doubt, a reasonable approach is to present both sets of evidence; if the two bodies of evidence have similar quality but discrepant results, one would rate down further for inconsistency. For binary outcomes, relative risks (RRs) are the preferred measure of relative effect and, in most instances, are applied to the baseline or control group risks to generate absolute risks. Ideally, the baseline risks come from observational studies including representative patients and identifying easily measured prognostic factors that define groups at differing risk. In the absence of such studies, relevant randomized trials provide estimates of baseline risk. When confidence intervals (CIs) around the relative effect include no difference, one may simply state in the absolute risk column that results fail to show a difference, omit the point estimate and report only the CIs, or add a comment emphasizing the uncertainty associated with the point estimate.

Presenting continuous outcomes in Summary of Findings tables presents particular challenges to interpretation. When each study uses the same outcome measure, and the units of that measure are intuitively interpretable (e.g., duration of hospitalization, duration of symptoms), presenting differences in means is usually desirable. When the natural units of the outcome measure are not easily interpretable, choosing a threshold to create a binary outcome and presenting relative and absolute effects become a more attractive alternative. When studies use different measures of the same construct, calculating summary measures requires converting to the same units of measurement for each study. The longest standing and
most widely used approach is to divide the difference in means in each study by its standard deviation and present pooled results in standard deviation units (standardized mean difference). Disadvantages of this approach include vulnerability to varying degrees of heterogeneity in the underlying populations and difficulties in interpretation. Alternatives include presenting results in the units of the most popular or interpretable measure, converting to dichotomous measures and presenting relative and absolute effects, presenting the ratio of the means of intervention and control groups, and presenting the results in minimally important difference units. We outline the merits and limitations of each alternative and provide guidance for meta-analysts and guideline developers.


Prehospital emergency medicine is a challenging discipline characterized by a high level of acuity, a lack of clinical information and a wide range of clinical conditions. These factors contribute to the fact that prehospital emergency medicine is a high-risk discipline in terms of medical errors. Prehospital use of Computerized Decision Support System (CDSS) may be a way to increase patient safety but very few studies evaluate the effect in prehospital care. The aim of the present study is to evaluate a CDSS. In this non-blind block randomized, controlled trial, 60 ambulance nurses participated, randomized into 2 groups. To compensate for an expected learning effect the groups was further divided in two groups, one started with case A and the other group started with case B. The intervention group had access to and treated the two simulated patient cases with the aid of a CDSS. The control group treated the same cases with the aid of a regional guideline in paper format. The performance that was measured was compliance with regional prehospital guidelines and On Scene Time (OST). There was no significant difference in the two group's characteristics. The intervention group had a higher compliance in the both cases, 80% vs. 60% (p<0.001) but the control group was complete the cases in the half of the time compare to the intervention group (p<0.001). The results indicate that this CDSS increases the ambulance nurses' compliance with regional prehospital guidelines but at the expense of an increase in OST.


(Review)
The prehospital management of serious injury is a key skill required of pitch-side medical staff. Previously, specific training in sports prehospital-immediate care was lacking or not of a comparable standard to other aspects of emergency care. Many principles have been drawn from general prehospital care or in-hospital training courses. This article discusses sports prehospital-immediate care as a niche of general prehospital care, using spinal injury management as an illustration of the major differences. It highlights the need to develop the sport-specific prehospital evidence base, rather than relying exclusively on considerations relevant to prolonged immobilisation of multiply injured casualties from motor vehicle accidents, falls from height or burns.

Full text available for free at: http://bjsm.bmj.com/content/46/16/1097.full.pdf+html


(Retrospective review)
Objective: To determine the current public health burden of injuries due to caustic ingestion in children. Design: The 2009 Kids' Inpatient Database provides data on a sample of all pediatric hospital discharges in the United States during that year. Children with caustic ingestion injuries requiring hospitalization were identified by corresponding codes from the International Classification of Diseases, Ninth Revision. Database analysis generated national estimates of summary statistics. Setting: A national database. Patients: Representative sample of all hospital discharge data on patients 18 years or younger. Main Outcome Measures: Public health burden related to caustic injury, including potential factors related to admission outcome, the necessity of a procedure during the admission, admission length of stay, and total charges for the admission. Results: We estimated the prevalence of pediatric caustic ingestion injuries requiring hospitalization in the United States in 2009 to be 807 (95% CI, 731-882) children. The annual economic burden was estimated at $22 900 000 (95% CI, $15 400 000 - $30 400 000) in total hospital charges. The mean charge per patient was estimated at $28 860 (95% CI, $19 799 - $37 922) with a median of $9848. The mean length of admission was 4.13 (95% CI, 3.22-5.03) days with a median of 2 days. Among the 807 patients, 45.3% underwent esophagoscopy, and those admitted to teaching hospitals were more likely to undergo a procedure during their stay (P = 0.02). Logistic regression models suggested significant median income (P < 0.001) and sex (P < 0.001) variations. Conclusions: The current public health burden of pediatric caustic ingestion injuries may be less than commonly cited. This finding supports the notion that legislative efforts have been successful. Despite these successes, these injuries continue to impose a significant burden on health care resources.


Although coronary vasospasm (CVS) would be one of the major causes of out-of-hospital cardiac arrest (OHCA), the characteristics of patients with cardiac arrest caused by CVS have not been clarified. Methods and Results: In study 1, 1,000 consecutive patients with OHCA were retrospectively categorized based on the cause of OHCA, and the prevalence of CVS OHCA was elucidated. In study 2, 138 consecutive CVS patients were divided into 2 groups: CVS with cardiac arrest (arrest-CVS, n=12) and CVS without cardiac arrest (non-arrest-CVS, n=126). In study 1, 589 patients had OHCA caused by cardiovascular disease and 121 patients were successfully resuscitated. Among the 121 resuscitated patients, 9 had CVS OHCA. In study 2, the incidence of cardiac events (ie, cardiac arrest or chest pain) occurring on vigorous exertion, in the daytime and without prodromal chest symptoms was higher in the arrest-CVS group than in the non-arrest-CVS group. Conclusions: CVS is an important cause of OHCA. Because significantly different characteristics are observed between CVS patients with cardiac arrest and those without, care should be taken to diagnose CVS as the cause of cardiac arrest.


Objective: Asia–Pacific countries have unique prehospital emergency care or emergency medical services (EMS) systems, which are different from European or Anglo-American models. We aimed to compare the EMS systems of eight Asia–Pacific countries/regions as part of the Pan Asian Resuscitation Outcomes Study (PAROS), to provide a basis for future comparative studies across systems of care. Methods In the first phase, a systematic literature review of EMS system within the eight PAROS countries/regions of interest was conducted. In the second phase, PAROS site directors were surveyed for additional information about the demographics and characteristics of EMS services at their sites. Results The database and bibliography search identified 25 eligible articles. The survey of EMS systems was completed by seven PAROS directors. By combining
information sources from phases 1 and 2, we found that all PAROS EMS systems were single-tiered, and most were public (vs private) and fire-based (Thailand, Malaysia, Singapore, Taiwan, Japan, Korea). Ambulance personnel were primarily emergency medical technicians and paramedics, except for Thailand and Turkey, whose personnel include nurses and physicians. Personnel were trained to use automated external defibrillators and have basic cardiac life support certification. The service capability of each EMS system in terms of dispatch, airway management and medications, for example, varied greatly. Conclusion: We found variation in the EMS systems across the eight Asia–Pacific countries/regions studied. The findings will inform the construction of a multinational Asia–Pacific research network for future comparative studies and could serve as a model for international research networks.


(Mannequin study)
Purpose and background: Emergency medical services (EMSs) vary considerably. While some are physician staffed, most systems are run by paramedics. The objective of this randomized, controlled simulation study was to compare the emergency care between physician staffed EMS teams (control group) and paramedic teams that were supported telemedically by an EMS physician (telemedicine group). Methods: Overall 16 teams (1 EMS physician, 2 paramedics) were randomized to the control group or the telemedicine group. Telemedical functionalities included two-way audio communication, transmission of vital data (numerical values and curves) and video streaming from the scenario room to the remotely located EMS physician. After a run-in scenario all teams completed four standardized scenarios, in which no highly invasive procedures (e.g. thoracic drain) were required, two using high-fidelity simulation (burn trauma, intoxication) and two using standardized patients (renal colic, barotrauma). All scenarios were videotaped and analyzed by two investigators using predefined scoring items. Results: Non case-specific items (31 vs. 31 scenarios): obtaining of 'symptoms', 'past medical history' and 'events' were carried out comparably, but in the telemedicine group 'allergies' (17 vs. 28, OR 7.69, CI 2.1, 27.9, p = 0.002) and 'medications' (17 vs. 27, OR 5.55, CI 1.7, 18.0, p = 0.004) were inquired more frequently. No significant differences were found regarding the case-specific items and in both groups no potentially dangerous mistreatments were observed. Conclusion: Telemedically assisted paramedic care was feasible and at least not inferior compared to standard EMS teams with a physician on-scene in these scenarios.


(Case study)
We present a case of successful prehospital treatment of hypoglycemia with intranasal (IN) glucagon. Episodes of hypoglycemia can be of varying severity and often requires quick reversal to prevent alteration in mental status or hypoglycemic coma. Glucagon has been shown to be as effective as glucose for the treatment of hypoglycemia. The inability to obtain intravenous (IV) access often impairs delivery of this peptide and is therefore frequently given via the intramuscular (IM) route. Intranasal administration of glucagon has been shown to be as effective as the IV route and may be used for rapid correction of hypoglycemic episodes where IV access is difficult or unavailable and IM administration is undesirable. We describe the first documentation in the peer-reviewed literature of the successful treatment and reversal of an insulin-induced hypoglycemic episode with IN glucagon in the prehospital setting. We also present a review of the literature regarding this novel medication administration route.
55. Walsh B, Cone DC, Meyer EM and Larkin GL. *Paramedic Attitudes Regarding Prehospital Analgesia*. Prehosp Emerg Care 2013; 17 (1): 78-87
(Qualitative study)
Introduction. Although pain is a major reason why patients summon emergency medical services (EMS), prehospital medical providers administer analgesic agents at inappropriately low rates. One possible reason is the role of EMS provider attitudes. Objective. This study was conducted to elicit attitudes that may act as impediments or deterrents to administering analgesia in the prehospital environment. Methods. A qualitative methodology was employed. We recruited experienced paramedics, with at least one year of full-time fieldwork, from a variety of agencies in New England. We sought to include a balance of rural and urban as well as both private and hospital-based agencies. Participants at each site were selected through purposive sampling. A semi-structured discussion guide was designed to elicit the paramedics’ past experiences with administering analgesia, as well as reflections on their role in the care of patients in pain. Both interviews and focus groups were conducted. These sessions were recorded and transcribed verbatim. The transcripts were topic-analyzed and iteratively coded by two independent investigators utilizing the constant comparative method of Glaser and Strauss’ Grounded Theory; coding ambiguities were resolved by consensus. Through a series of conceptual mapping and iterative code refinement, themes and domains were generated. Results. Fifteen paramedics from five EMS agencies in three New England states were recruited. Major themes were: 1) a reluctance to administer opioids to patients without significant objective signs (e.g., deformity, hypertension); 2) a preoccupation with potential malingering; 3) ambivalence about the degree of pain control to target or to expect (e.g., aiming to “take the edge off”); 4) a fear of masking diagnostic symptoms; and 5) an aversion to aggressive dosing of opioids (e.g., initial doses of morphine did not exceed 5 mg). Conclusions. A number of potentially modifiable attitudinal barriers to appropriate pain management were revealed.

The dangers of shopping, speed humps as a diagnostic tool, rock stars and death…and, apparently we all want to date a good sort….

Objective: To assess the diagnostic accuracy of pain on travelling over speed bumps for the diagnosis of acute appendicitis. Design: Prospective questionnaire based diagnostic accuracy study. Setting: Secondary care surgical assessment unit at a district general hospital in the UK. Participants: 101 patients aged 17-76 years referred to the on-call surgical team for assessment of possible appendicitis. Main outcome measures: Sensitivity, specificity, positive and negative predictive values, and positive and negative likelihood ratios for pain over speed bumps in diagnosing appendicitis, with histological diagnosis of appendicitis as the reference standard. Results: The analysis included 64 participants who had travelled over speed bumps on their journey to hospital. Of these, 34 had a confirmed histological diagnosis of appendicitis, 33 of whom reported increased pain over speed bumps. The sensitivity was 97% (95% confidence interval 85% to 100%), and the specificity was 30% (15% to 49%). The positive predictive value was 61% (47% to 74%), and the negative predictive value was 90% (56% to 100%). The likelihood ratios were 1.4 (1.1 to 1.8) for a positive test result and 0.1 (0.0 to 0.7) for a negative result. Speed bumps had a better sensitivity and negative likelihood ratio than did other clinical features assessed, including migration of pain and rebound tenderness. Conclusions: Presence of pain while travelling over speed bumps was associated with an increased likelihood of acute appendicitis. As a diagnostic variable, it compared favourably with other features commonly used in
clinical assessment. Asking about speed bumps may contribute to clinical assessment and could be useful in telephone assessment of patients.


Objectives: Rock and pop fame is associated with risk taking, substance use and premature mortality. We examine relationships between fame and premature mortality and test how such relationships vary with type of performer (eg, solo or band member) and nationality and whether cause of death is linked with preface (adverse childhood) experiences. Design: A retrospective cohort analysis based on biographical data. An actuarial methodology compares postfame mortality to matched general populations. Cox survival and logistic regression techniques examine risk and protective factors for survival and links between adverse childhood experiences and cause of death, respectively. Setting: North America and Europe. Participants: 1489 rock and pop stars reaching fame between 1956 and 2006. Outcomes: Stars’ post fame mortality relative to age-, sex- and ethnicity-matched populations (USA and UK); variations in survival with performer type, and in cause of mortality with exposure to adverse childhood experiences. Results: Rock/pop star mortality increases relative to the general population with time since fame. Increases are greater in North American stars and those with solo careers. Relative mortality begins to recover 25 years after fame in European but not North American stars. Those reaching fame from 1980 onwards have better survival rates. For deceased stars, cause of death was more likely to be substance use or risk-related in those with more adverse childhood experiences. Conclusions: Relationships between fame and mortality vary with performers’ characteristics. Adverse experiences in early life may leave some predisposed to health-damaging behaviours, with fame and extreme wealth providing greater opportunities to engage in risk-taking. Millions of youths wish to emulate their icons. It is important they recognise that substance use and risk-taking may be rooted in childhood adversity rather than seeing them as symbols of success.

Full text available for free at: http://bmjopen.bmj.com/content/2/6/e002089.full

58. Cutler R. Money and credit cards and faecal matter.

One in 10 bank cards and one in seven notes are contaminated with faecal organisms, research from Queen Mary, University of London has revealed. The nationwide study for Global Hand washing Day today investigated levels of bacterial contamination on the hands, credit cards and currency of various sample sizes in East and West London, Birmingham and Liverpool. The research highlights the importance of hand washing with soap before eating and after using the toilet. The study, in conjunction with the London School of Hygiene & Tropical Medicine, also found that more than a quarter of hands sampled (26 per cent) showed traces of faecal contamination including bacteria such as E. coli. More significantly, out of the samples taken, 11 per cent of hands, eight per cent of cards and six per cent of notes showed gross contamination—where the levels of bacteria detected were equal to that you would expect to find in a dirty toilet bowl. The participants who took part in the scientific study were also asked to fill out a questionnaire with the results revealing only 39% of respondents washed their hands before eating. 91% of respondents also stated that they washed their hands after using the toilet, although the surprising levels of faecal organisms contaminating the cards and currency suggest otherwise. Washing hands with soap can reduce diarrhoeal infections by up to 42% but only 69% of people reported doing this whenever possible. Dr Ron Cutler, who led the research at Queen Mary, said: “Our analysis revealed that by handling cards and money each day we are coming into contact with some potential pathogens revealing faecal contamination including E. Coli and Staphylococci. “People may tell us they
wash their hands but the research shows us different, and highlights just how easily transferable these pathogens - surviving on our money and cards.” Dr. Val Curtis, from London School of Hygiene & Tropical Medicine who is leading the UK campaign for Global Handwashing Day said: “Our research shows just how important hand washing is - the surprising levels of contamination that we found on everyday objects is a sign that people are forgetting to wash their hands after the toilet, one of the key moments for infection prevention.

Five studies develop and examine the predictive validity of an implicit measure of the preference for physical attractiveness in a romantic partner. Three hypotheses were generally supported. First, 2 variants of the go/no-go association task revealed that participants, on average, demonstrate an implicit preference (i.e., a positive spontaneous affective reaction) for physical attractiveness in a romantic partner. Second, these implicit measures were not redundant with a traditional explicit measure: The correlation between these constructs was .00 on average, and the implicit measures revealed no reliable sex differences, unlike the explicit measure. Third, explicit and implicit measures exhibited a double dissociation in predictive validity. Specifically, explicit preferences predicted the extent to which attractiveness was associated with participants' romantic interest in opposite-sex photographs but not their romantic interest in real-life opposite-sex speed-daters or confederates. Implicit preferences showed the opposite pattern. This research extends prior work on implicit processes in romantic relationships and offers the first demonstration that any measure of a preference for a particular characteristic in a romantic partner (an implicit measure of physical attractiveness, in this case) predicts individuals' evaluation of live potential romantic partners.