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ABSTRACTS National Association of EMS Physicians 2004 Annual Meeting



1.9% thought they would hurt the patient. Surprisingly, only 0.08% objected to performing mouth-to-mouth resuscitation. **Conclusion:** CPR initiation was positively associated with a witnessed arrest, the presence of CPR trained bystanders, and a bystander educational level greater than high school. Negative associations were noted with home arrests, family member as a bystander, and longer delays since bystander CPR training. CPR programs must focus on providing CPR to family members and address stress responses to a family emergency.

03 POST-RESUSCITATION HEMODYNAMICS AND RELATIONSHIP TO DURATION OF VENTRICULAR FIBRILLATION **Ramiro Ramos, James Menegazzi, Henry Wang, Clifton Callaway, University of Pittsburgh**

Introduction: We have observed consistent hemodynamic patterns after restoration of spontaneous circulation (ROSC) after ventricular fibrillation (VF) cardiac arrest. **Objective:** We sought to characterize the time course of these patterns, and to determine whether these differed based on duration of the VF insult. **Methods:** We used 21 mixed-breed domestic swine of either sex (wt range 19.5–25.7 kg). Animals were anesthetized and instrumented for continuous recording of ECG and blood pressures. VF was induced electrically and allowed to progress for various times ranging from brief (22 s) to moderate (less than 3 minutes) to prolonged (3 to 10 minutes). All animals were initially shocked (150 J) up to three times. If ROSC was not achieved on the 3 initial shocks, a standardized treatment protocol was followed. Additional rescue shocks were given at 1-minute intervals if the ECG rhythm was VF. We defined cardiovascular collapse as a SBP < 90 mm Hg sustained for 1 minute. If collapse occurred IV norepinephrine was administered, titrated to effect. For statistical purposes, we classified animals as having VF of < 3 minutes or > 3 minutes duration. Data were analyzed with Fisher's exact test and Cox proportional hazard modeling. **Results:** A hyperdynamic phase, consisting of very high blood pressures and tachycardia, was seen in all animals immediately after ROSC. This lasts from 1 to 4 minutes. Cardiovascular collapse occurred in 2/7 (29%) animals in the < 3 minute group and 13/14 in the > 3 minute group (93%), $p = 0.006$. Cox proportional hazard modeling showed that time to collapse was highly related to duration of VF (log likelihood -33 , $p < 0.001$). **Conclusion:** There are two phases of hemodynamic change after prolonged VF. There is a brief hyperdynamic phase that lasts 1–4 minutes. When VF is brief, blood pressures return to normal without exogenous support. When VF is prolonged, there is a second phase, cardiovascular collapse, which follows the hyperdynamic phase. EMS caregivers should be prepared for cardiovascular collapse in patients having ROSC after prolonged VF.

04 INTRAVENOUS INFUSION OF ICE-COLD NORMAL SALINE RAPIDLY INDUCES HYPOTHERMIA AFTER RESUSCITATION FROM CARDIAC ARREST **James Menegazzi, Clifton Callaway, University of Pittsburgh**

Introduction: Two human trials have shown that post-resuscitation induction of hypothermia improves survival

and neurologic outcome in survivors of sudden cardiac arrest. **Objective:** We sought to determine whether rapid intravenous infusion of ice-cold normal saline solution (NSS), as could be initiated in the prehospital setting, could promote hypothermia in an established swine model of prolonged ventricular fibrillation (VF). **Methods:** Five immature domestic swine (mean 25.5 kg) were anesthetized and instrumented for recording of ECG, blood pressures, and esophageal temperatures. A 9-Fr, 11 cm long, introducing catheter (Cordis, Miami, FL) was placed in the right femoral vein for infusion of NSS. VF was electrically induced and untreated for 8 minutes, then animals were given drugs (40 U vasopressin, 0.10 mg/kg epinephrine, 1.0 mg propranolol) during 3 minutes of mechanical CPR, then shocked (150 J biphasic) into return of spontaneous circulation (ROSC). Nine minutes later, a second bout of VF (5 minutes long) was induced. Immediately after the second ROSC, high-pressure (300 torr) infusion of 1,000 mL (40 mL/kg) of 2-degree NSS was begun. Temperatures (reported in degrees C) were recorded at baseline and every minute until 20 minutes after the second ROSC, and are reported using descriptive statistics. **Results:** Mean (SD) baseline temperature was 39.1 (0.4), and ambient temperatures were 26.6. It took an average of 6.0 minutes to complete the infusion. The temperature at minute 3 of the infusion was 36.7 (1.0), and was 33.7 (1.1) at minute 6. Temperature nadir occurred in minute 8, at 32.6 (1.5), then rose to 33.0 (1.7) at minute 10, 34.2 (1.8) at minute 15, and 35.5 (1.4) at minute 20. We also observed hemodilution from baseline (Hct 35.0) to end of infusion (Hct 24), which has also been shown to be beneficial after cardiac arrest. The hyperdynamic phase after ROSC appeared to be blunted by hypothermia. **Conclusion:** Induction of hypothermia in the prehospital setting using cold intravenous fluids may be feasible. While temperatures dropped rapidly and rebounded during a prehospital time course, they remained beneficially low at experiment's end.

05 CHAIN OF SURVIVAL PROMPTS FOR UNTRAINED LAYPEOPLE FACED WITH OUT-OF-HOSPITAL CARDIAC ARREST **Hisham Elkadi, Steven Miller, Ziad Elghazzawi, James Brewer, Quincy Medical Center**

Introduction: The American Heart Association (AHA) maintains that high survival rates from out-of-hospital cardiac arrest (OHCA) can be achieved only when all elements of the chain of survival (COS) are applied. Presently available automated external defibrillators (AEDs) are designed with specialized defibrillation prompts to assist trained personnel. We hypothesized that AED prompts designed to assist with all steps in the chain of survival may significantly increase the number of COS steps performed by untrained laypersons during an OHCA rescue attempt. Such AED assistance may become important as public access defibrillation becomes widely available to laypeople. **Methods:** New COS prompts were developed for AED use during OHCA resuscitation attempts. The COS prompts were designed to assist untrained laypeople with basic life support (BLS) skills that comprise the chain of survival. The prompts were placed into an AED modified for the study and were compared to the Medtronic Lifepak CR Plus and Zoll Medical AEDPlus prompts. We evaluated the

COS prompts on laypeople who had had CPR training between 1 and 5 years prior to the study, but who had no training or experience using an AED. Participants entered a simulated office after receiving minimal instructions regarding the possibility of finding an OHCA victim. A resuscitation manikin was used to simulate the arrest victim. The rescue attempt was evaluated based on the number of eight BLS actions performed: check response, seek help, open airway, check breathing, give breaths, check circulation, remove clothing, and attach electrodes. **Results:** The Medtronic group ($n = 11$) averaged 3.5 ± 1.4 steps completed (44%), the Zoll group ($n = 11$) averaged 5.0 ± 1.3 steps completed (63%), and the COS prompts group ($n = 13$) averaged 5.9 ± 1.2 steps completed (74%, $p < 0.001$, $p < 0.046$, respectively, between the AEDs and the COS prompts). Age, gender, and length of time since the subject last had CPR training had no statistically significant impact on the number of COS steps completed. **Conclusion:** The new COS prompts, designed for untrained laypersons, significantly increased the number of chain of survival steps performed by such persons when compared to presently available AEDs in the setting of simulated OHCA.

06 ATTENUATED ADULT BIPHASIC SHOCKS VERSUS WEIGHT-BASED MONOPHASIC SHOCKS IN A SWINE MODEL OF PROLONGED PEDIATRIC VENTRICULAR FIBRILLATION **Robert Berg, Fred Chapman, Marc Berg, Ronald Hilwig, Isabelle Banville, Robert Walker, Richard Nova, Karl Kern, University of Arizona Tucson**

Introduction: Standard therapy for patients under 8 years old in ventricular fibrillation (VF) is to shock with a weight-based defibrillation dose. Since weight-based dosing is not feasible for automated external defibrillators (AEDs), it is important to learn if a single escalating energy sequence is effective over the weight range of children under 8. If attenuated adult shocks are safe and effective for prehospital pediatric VF, automated external defibrillators can be easily adapted for pediatric use. The purpose of this study was to compare the safety and efficacy of attenuated adult biphasic shocks with standard monophasic weight-based shocks in a piglet model of prolonged prehospital ventricular fibrillation. **Methods:** After 7 minutes of untreated VF, piglets were randomized to treatment with attenuated adult biphasic shocks or weight-based monophasic shocks. The attenuated adult biphasic group received 200/300/360 J shocks, attenuated by specialized pediatric electrodes to 51/78/81 J, and the monophasic weight-based control group received 2/4/4 J/kg shocks. Forty-eight female piglets were studied, 16 in each of three weight categories: 4-kg (neonatal), 14-kg (younger child), and 24-kg (older child). The primary outcome measures of efficacy and safety were 24-hour survival with good neurological outcome and post-resuscitation left ventricular ejection fraction (LVEF), respectively. **Results:** For the 24-kg piglets, attenuated adult biphasic shocks resulted in superior 24-hour survival with good neurological outcome (6/8 vs 0/8, $p < 0.001$) and greater LVEF 4 hours post-resuscitation ($34 \pm 4\%$ vs $18 \pm 5\%$, $p < 0.05$). For the 14-kg and 4-kg piglets, 24-hour survival with good neurological outcome occurred in 7/8 vs 5/8 and 7/8 vs 3/8, respectively, and LVEF

4 hours post-resuscitation was $30 \pm 3\%$ vs $36 \pm 6\%$ and $30 \pm 3\%$ vs $22 \pm 4\%$, respectively. **Conclusion:** The escalating attenuated adult biphasic dosage strategy was at least as safe and effective as the standard weight-based monophasic dosing over a wide range of weights in this piglet model of prehospital VF. This work supports the concept of using an attenuated adult biphasic dosage in children.

07 PARAMEDICS CAN SUCCESSFULLY SCREEN OLDER ADULTS DURING EMERGENCY RESPONSES **Manish Shah, E. Brooke Lerner, Sharon Chiumento, Eric Davis, University of Rochester School of Medicine and Dentistry**

Objective: To evaluate the feasibility of using the EMS system as a public health provider by having paramedics screen older adults (aged 65 or older) for influenza immunization status during emergency responses. To also determine the proportion of the older adult EMS patients who lacked influenza vaccination during Winter 2002. **Methods:** A retrospective cohort study with medical record review for patients cared for between January and April 2003 was performed. Patients were included if they were age 65 and older, requested assistance via 911, and were cared for by one of 13 paramedics using a new, scannable medical record. We abstracted the EMS record of included patients. We calculated the proportion of patients successfully screened and the proportion of patients who reported being unimmunized. We also evaluated differences between the patients screened and not screened by EMS and patients who were immunized and not immunized. **Results:** 288 patients were eligible; the median age was 80; 53% were female; 73% were white; 59% required advanced life support care. 177 (61%, 95% CI: 56%–67%) were successfully screened. 65 (37%, 95% CI: 30%–44%) of those screened reported being unimmunized. Failure to screen was associated with Glasgow Coma Scale score of 13 or less and complaints including cardiovascular or neurological problems. Lack of immunization was associated with younger age and female gender. **Conclusion:** Paramedics in the field can successfully screen a majority of older adults for influenza immunization status during emergency responses. Older adult EMS users report lacking influenza vaccination at levels similar to national and regional estimates. An EMS based, paramedic implemented screening program has the potential to identify older adults at risk for preventable injuries and illnesses and augment traditional screening programs.

08 HAND SANITIZATION RATES IN AN URBAN EMS SYSTEM **Rebecca Ansari, Jeffrey Ho, David Page, Hennepin County Medical Center**

Introduction: Hand sanitizing, although often a “forgotten” practice, has been demonstrated to be a leading factor in preventing infectious disease transmission in health care environments. Previous studies have looked at hand sanitization rates in hospital settings, but we are unaware of any describing this in the prehospital setting. This study describes the hand sanitization rates of an urban EMS system. **Methods:** A convenience sampling of an urban paramedic

skills in two senior communities. **Methods:** The project received full IRB approval, and written, informed consent was obtained from all participants. 83 participants were recruited and trained from two retirement communities. 58 of these were 55 years of age and older and comprised the study group. Subjects were group-randomized to receive either traditional training or the memory technique augmented training. Both the participants and the testers were blinded to this allocation. The AHA's Heartsaver AED Course[®] was used for training both groups. Augmenting the traditional instruction, the trial group was taught acronyms for crucial aspects of both CPR and AED deployment. Immediately before dismissal, the trial group also performed a novel visualization exercise to reinforce key concepts. The primary outcome measure was participants' score on a standardized 10-point skill performance test. All data were recorded in an Excel spreadsheet and analyzed using NCSS statistical software. **Results:** 28 subjects received traditional training, and 30 subjects received the augmented training. There was no statistically significant difference between the groups in terms of their age, gender, highest achieved level of education, or previous AED/CPR training. All participants completed the initial training and were able to perform CPR and deploy an AED. At the 3-month reevaluation, the mean test score was 8.0 (95% CI = 6.782–9.22) for the control group and 7.59 (95% CI = 6.29–8.89) for the trial group ($p = 0.63$). Although there was no difference between the groups regarding the proportion who were able to correctly place the AED pads (control = 81.2% vs. trial = 70.6%; $\chi^2 = 0.095$) these percentages are higher than previously reported. **Conclusion:** Senior citizens are capable of learning and effectively performing CPR and AED placement. Simple memory techniques added to traditional training do not improve retention of these lifesaving skills.

31 LAY RESCUER ADHERENCE TO THE CHAIN OF SURVIVAL: A COMPARISON OF FOUR AUTOMATED EXTERNAL DEFIBRILLATORS
Steven G. Miller, Hisham S. Elkadi, Ziad F. Elghazzawi, James E. Brewer, Harvard Medical School

Background: The AHA maintains that the highest survival rates from cardiac arrest are achieved only when all elements of the chain of survival (COS) are performed. Until recently, automated defibrillators have focused solely on defibrillation. **Objective:** It is well established that retention of CPR skills is poor. Automated external defibrillators (AEDs), however, have been shown to be simple enough to be used by schoolchildren with good skills retention. Some are now available with prompts for CPR. This study compares the use of AEDs by laypeople untrained in AED use but with some CPR training in the past. **Methods:** There were 45 study participants; time since CPR training 3 ± 1.3 years. To eliminate bias, no subject had prior AED training. Four defibrillators were used: Medtronic/Physio-Control LifePak CRplus, Zoll AEDplus, Philips/Laerdal OnSite, and Cardiac Science PowerHeart. In an office, the subjects were told that a person (actually a manikin) had fallen to the floor and to use any available object to "save" the person. The performance criteria were: number of COS actions performed (check response, seek help, open airway, check breathing, give

breaths, check circulation, remove clothing, electrodes). **Results:** Medtronic: 11 subjects; correct COS actions (CCA) = 3.5 ± 1.4 (44% completed); Cardiac Science: 11 subjects; CCA = 3.4 ± 1.9 ; (43%); Philips: 12 subjects; CCA = 3.8 ± 1.3 ; (48%); Zoll: 11 subjects; CCA = 5.0 ± 1.3 ; (63%, $p < 0.017$, $p < 0.032$, $p < 0.038$, respectively, between Zoll and other AEDs, 2-sided comparison). All participants were able to operate the AED to which they were randomly assigned. Participants who used the Zoll AEDplus, which provides support prompts for each component of the chain, did significantly better than those who used the other three devices. **Conclusion:** AEDs are easy to use, while CPR and the ABCs remain difficult to perform. Based on adherence to the chain of survival guidelines, however, those who used the Zoll device performed significantly better than those who used the other devices. Since each link in the COS has been shown to be critical, this study suggests that AED devices that provide support prompts for the chain of survival may help to achieve higher survival rates for out-of-hospital cardiac arrest.

32 PROGRAM CHARACTERISTICS AND PERSONNEL ATTITUDES TEN YEARS AFTER INITIATION OF A POLICE DEFIBRILLATION PROGRAM
Kendra Papson, Vincent N. Mosesso, Jr., University of Pittsburgh

Objective: In 1992, defibrillation programs were initiated in seven suburban police departments as part of a six-year study to evaluate the effectiveness of police defibrillation. Research oversight and support ended in early 1998. This study describes the current characteristics of these programs and assesses the attitudes of chiefs and officers regarding AED use and the role of police as medical providers. **Methods:** Survey instruments were sent to the current police chiefs and officers in the seven departments. A 32-item questionnaire requesting demographic and program information was mailed to the chiefs, including questions on attitudes toward police defibrillation. A separate 25-item questionnaire was distributed to the officers to assess their attitudes toward police defibrillation. A non-management officer distributed and collected the surveys anonymously. Survey responses were recorded in Microsoft Access. **Results:** All seven chiefs and 80% of officers completed surveys. All officers receive CPR/AED training, and all seven departments are dispatched simultaneously with emergency medical services (EMS). Police arrive prior to EMS on 80% of calls with a mean response time of 3 ± 2 minutes. All defibrillation programs have a medical director and a program coordinator, and three departments have a quality improvement program. Five departments have liability coverage for AED use, and no department reported any recent concerns regarding liability issues. Five chiefs and 82% of officers disagreed or strongly disagreed that liability issues are a concern or a source of hesitation in using the AED. 96% of officers agreed or strongly agreed that police AED use is beneficial to cardiac arrest victims, and 95% agreed or strongly agreed that they could provide initial medical care to cardiac arrest victims. All seven police chiefs and 89% of officers agreed or strongly agreed that AED use by police is appropriate. **Conclusions:** In these seven police departments with ten years of program experience,