Conclusions: The TIMI risk index provides excellent prediction of long-term mortality after hospitalization with primary UA, independent of other variables. Our findings extend the utility of this risk index to unscreened patients with UA and to long-term risk prediction.

1072-105
Impact of Diabetes Mellitus on Long-Term Outcome
After Non-ST-Elevation Acute Coronary Syndromes
Treated With Very Early Revascularization
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Background: Limited information is available regarding the outcome of diabetic patients treated with very early revascularization for no-ST-elevation acute coronary syndromes (NSTEMI). Methods: We conducted a prospective cohort study in 2712 diabetics and 1163 nondiabetics with NSTEMI undergoing coronary angiography and subsequent revascularization within 24 hours of admission. The primary endpoint was all-cause mortality and was recorded for a mean of 20 months. Results: There were important differences in baseline characteristics. Most importantly, diabetics were older, and more often had previous myocardial infarction and three vessel disease as compared with nondiabetics. In addition, the NSTEMI was more severe in diabetics, as cardiovascular mortality, ST-segment depression and raised Troponin T occurred more often in diabetics. Consequently, in-hospital (4.1 versus 3.3%), hazard ratio 3.47; 95% CI, 1.57 to 7.64; p=0.002) and long-term mortality (9.7 versus 4.9%, hazard ratio 2.11; 95% CI, 1.33 to 3.36; p=0.002) were significantly higher in diabetics. However, after adjustment for these differences in baseline characteristics, diabetes was no longer an independent predictor of long-term mortality (hazard ratio 1.43; 95% CI, 0.74 to 2.78; p=0.392). The prognostic impact of diabetes was different in women and men. Conclusions: Diabetic patients with NSTEMI do have a higher in-hospital and long-term mortality due to their more advanced CAD and more severe NSTEMI. However, very early revascularization seems to improve outcomes in patients with diabetes and may compensate for much of the extra risk factors present particular in diabetic women.

POSTER SESSION
1073 Advances in Transthoracic Defibrillation
Monday, March 31, 2003. 9:00 a.m.-11:00 a.m.
 McCormick Place, Hall A
Presentation Hour: 9:00 a.m.-10:00 a.m.

1073-90
Comparison of Weight-Based Monophasic and Fixed-Sequence Biphasic Defibrillation Dosing for Resuscitation in a Model of Pediatric Prolonged Cardiac Arrest

Background: 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. Methods: After 7 minutes of untreated VF, 4, 14 and 24 kg piglets (10 of each weight) were randomized to receive monophasic 2, 4, 4 J/kg therapy (M) or a biphasic sequence of 50, 75, 86 J (B). Resuscitation was performed by peds BLS protocol to 20 minutes, then peds ALS protocol to 27 minutes. Endpoints: 4 hr survival and 24-hr survival with good neurological outcome (cardinal performance category <1 or 2) or were analyzed by Fisher's exact test; energy and number of shocks were analyzed by Student's t-test. Results: More than M B shocks failed to defibrillate the first episode of VF (12 ± 7 vs. 2 ± 3 failed shocks, p<0.001) resulting in higher cumulative energy for M than B (59 ± 29 vs. 24 ± 24 J/kg, p=0.001). More than B M piglets survived to 4 hrs (15/15 vs. 7/15, p=0.002) and subsequently survived to 24 hours with good neuro scores (14/15 vs. 5/15, p=0.01). Most non-survivors had refractory VF. Conclusions: This study showed that a single escalating biphasic dosing sequence consistently resuscitates piglets after prolonged VF, an important issue for pediatric AEDs. This therapy produced outcome superior to the recommended weight-based dosing over a wide weight range.

1073-91
Detection and Discrimination Performance of an Automatic External Defibrillator in Ambulatory Patients During Treadmill Exercise
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The Powerheart G3 CRM (Cardiac Rhythm Monitor) is the next generation automatic external cardioverter defibrillator (AECD) designed for in-hospital use. This AECD has a programmable supraventricular/ventricular tachycardia (SVT/VT) discrimination algorithm designed to inhibit therapy delivery in the presence of SVT. This algorithm is also incorporated into the Powerheart AED (Automatic External Defibrillator) designed for out of hospital, first responder use. The present study was performed to assess algorithm performance in ambulatory patients. A total of 50 participants (50 Males) in a cardiac rehabilitation program were attached to the AECD via externally applied adhesive electrode pads in the sternum-axema configuration. It was programmed to discriminate SVT from VT within a heart rate zone of 120 to 200 bpm in the advisory mode. Patients then walked on a conventional treadmill until limiting symptoms at 0.3 to 0.5 mph at 600-300-300 J/kg. The primary endpoint was successful defibrillation with <3 shocks.

Results: The mean TT was not different between the groups (Group 1, 82±110; Group 2, 95±120). nor was the first shock peak current (Group 1, 18±11.2 A; Group 2, 20±3±0.1 A). Only one of the group 1 patients (11%) could be defibrillated with <3 shocks, 15 J at 50 Hz. Group 2 patients were successfully defibrillated. Eight of 9 group 2 animals were defibrillated with <2 shocks (p<0.001 vs Group 1). The predictive value of the peak current of ≤10 Vm was 100%.

Conclusions: In this ischemically induced VF animal model, 1. fixed, lower energy shocks were less effective than higher energy delivered in an escalating dose protocol; 2. the effective energy dose for defibrillation was higher than that reported in electrically induced VF models. and 3. the electric field strength required for transcutaneous defibrillation was greater than 10 V/cm and a value less than this was predictive of defibrillation failure.
Performance of an Automated External Cardiopulse Defibrillator for In-Hospital Ventricular Malignant Arrhythmia

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Purpose: Ventricular fibrillation (VF) and ventricular tachycardia (VT) are the major underlying rhythm during in-hospital cardiac arrest. A patient in VF/VT has the probability of successful defibrillation and subsequent survival to hospital discharge is directly and negatively related to the time interval between onset of the arrhythmia and delivery of the first shock. The data about this interval in clinical practice is heterogeneous and inconclusive; however, the literature estimates it to be about 60 seconds in monitored units. Continuous ECG monitoring allows identification of such arrhythmias and alert nursing and medical staff. The time delay between the arrhythmia event and human intervention is still a challenge for clinical practice.

Methods: We reported the use of an automated external cardioverter defibrillator (AECD) in 45 patients considered to be at higher risk for malignant arrhythmia for 24 to 48 hours. The inclusion criteria was acute coronary syndrome, cardiogenic shock and previous episodes of sudden death or malignant ventricular arrhythmia. The exclusion criteria was the use of a pacemaker or an implantable cardioverter defibrillator and an R-wave amplitude less than 0.7 mV peak to peak at the monitor.

Results: We recorded 17 episodes of VF/VT in 3 patients. The median time between the beginning of the arrhythmia and the first defibrillation was 33.37 s (range 21 to 65 s). The sensitivity and specificity were 100%. The success of defibrillation was 84.11% (16/19) for the first shock and 100% (1/1) for the second shock. There was no adverse event during the study period and no episodes of inappropriate therapy delivery (the detection was accurate in all episodes - sensitivity 100%).

Conclusion: AECD was safe and effective. It presents the possibility of providing consistently rapid identification and response to ventricular malignant arrhythmia.

The Potential Impact of a Fully Automated External Cardiopulse Defibrillator in Centrally Monitored Hospital Units

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Background: Sudden Cardiac Arrest (SCA) survival decreases by 10% for each minute of delay in cardioversion, with survival rates of 98% when defibrillation is achieved within 30 seconds of collapse. This has led to increased use of semi-automated external defibrillators in many out-of-hospital settings. Recently, a fully automated external cardioverter-defibrillator (AECD) was approved by the FDA for in-hospital use. The AECD can be programmed to automatically defibrillate a life-threatening ventricular arrhythmia. The purpose of this study was to assess the potential impact of in-hospital AECDs on the critical time to defibrillation in monitored hospital units.

Methods: Mock codes (n=18) were conducted using simulated ventricular fibrillation in various monitored units. Observers were stationed to record the time staff responded to the arrhythmia, and the time to shock. These times were compared to an AECD protocol that automatically defibrillated at an average of 38.3 seconds from onset of arrhythmia (n=18).

Results: Staff vs AECD response time to arrhythmia (seconds) was 76.3 ± 113.7 (CI 19.6 - 132.6) vs 7.6 ± 0.6 (CI 7.3 - 7.9). Staff vs AECD time to shock was 169.2 ± 103.1 (CI 177.9 - 220.4) vs 38.3 ± 0.7 (CI 37.9 - 38.6). p values are < 0.0001 for differences between the groups.