

P65 Performance of an automated external cardioverter defibrillator for in-hospital ventricular malignant arrhythmia**S Timerman, A Bento, LF Cardoso, MA Moretti, NE Sanadi, JAF Ramires***Heart Institute (InCor), University of São Paulo Medical School, São Paulo, Brasil
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Purpose Ventricular fibrillation (VF) and ventricular tachycardia (VT) are the major underlying rhythm during in-hospital cardiac arrest. For a patient in VF/VT 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 s in monitored units. Continuous ECG monitoring allows identification of such arrhythmias and alert nursing and medical staff. The time delay between the arrhythmic event and human intervention is still a challenge for clinical practice.

Methods We reported the use of an automated external cardioverter defibrillator (AED) in 45 patients considered to be at higher risk for malignant arrhythmia for 24–48 hours. The inclusion criteria was acute coronary syndrome, cardiogenic shock and pre-

vious episode of sudden death or malignant ventricular arrhythmia. The exclusion criteria was the use of 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 VT/VF in three patients. The median time between the beginning of the arrhythmia and the first defibrillation was 33.37 s (range 21–65 s). The sensibility and specificity were 100%. The success of the defibrillation was 94.11% (16/17) 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 AED was safe and effective. It presents the possibility of providing consistently rapid identification and response to ventricular malignant arrhythmia.

P66 Comparison of exponential truncated biphasic versus damped sine wave monophasic shocks in transthoracic cardioversion of atrial fibrillation**VS Kawabata, LF Cardoso, S Timerman, LAM Cesar, JAF Ramires***Heart Institute (InCor), University of São Paulo Medical School, São Paulo, Brasil
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Background Clinical studies have shown the efficacy of the biphasic waveform (BW) in reversion of ventricular fibrillation using lower energies. However, the effects of the BW in the treatment of other arrhythmias is unclear. The amount of energy of each shock and the sequency of shocks are to be determined. The purpose of this study is to compare the efficacy and side effects of the BW and the monophasic waveform (MW) in reversion of atrial fibrillation (AF).

Methods In this prospective, randomized and unicenter trial we submitted 158 patients with AF to transthoracic cardioversion (CV). They were randomized in two groups. Group I, 80 patients underwent BW shocks (average age 55.9 ± 12.6 years old); and Group II, 78 patients underwent MW shocks (average age 59.8 ± 13.0 years old). Group I received sequential shocks of 50, 100, 150, and 175 J (half the energy used in Group II). Group II received sequential shocks of 100, 200, 300 and 360 J. We analyzed the clinical characteristics of both groups before CV (weight, height, AP thoracic diameter, body surface, oxymetry, body temperature, noninvasive blood pressure, duration of AF, ven-

tricular response). Blood samples of cardiac and muscle markers of injury (CK, MB-CK, AST, ALT, DHL) were obtained before, 1 hour and 24 hours after CV.

Results The first-shock efficacy was similar in both groups (56.3% vs 53.9%, Group I and Group II, respectively) as well the cumulative efficacy of sequential shocks rate (88.0% vs 92.3%, $P=0.415$). Baseline characteristics were similar in both groups. Age and baseline cardiac frequency were independent predictors of CV success. Patients in Group II had higher elevations on serum CK (83.0 ± 106.3 vs 178.9 ± 306.9 , $P=0.0087$). There was a clear relation between CK elevation and cumulated energy used in CV ($P=0.0001$). No other injury marker was elevated after CV in both groups.

Conclusions Biphasic shock with a truncated exponential waveform was equally effective as monophasic damped sine waveform, causing less muscular injury, using only half the energy of the monophasic defibrillator.

P67 Ventricular fibrillatory frequency and its correlation with transthoracic defibrillation current requirement**VA Vostrikov, KV Razumov***Moscow Medical Academy, 2/6 Bolshaya Pirogovskaya str, Moscow, Russia 119881
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Correlation between ventricular fibrillatory frequency (VFF) in patients with ventricular fibrillation (VF) and transthoracic defibrillation current was studied. Strong positive correlation between VFF and optimal defibrillation current was revealed in patients with primary VF. There was a significant negative correlation between TTI and defibrillation current, that ceased secondary VF, and there was no significant correlation between TTI and current in patients with primary VF.

Introduction The efficacy of external defibrillation depends on various both cardiac and noncardiac factors. Heart function status, waveform shock (monophasic and biphasic) and chest impedance play important roles among them. The aim of this study was the research of the correlation between VFF in patients with primary (1-ry) and secondary (2-ry) VF and the value of defibrillation current.

Methods Twenty patients with 1-ry VF and 28 patients with 2-ry VF were studied. VF mostly occurs during the acute phase of myocardial infarction. The efficacy of external defibrillation depends on various both cardiac and noncardiac factors. Heart function status, waveform shock (monophasic and biphasic) and chest impedance play important roles among them. The duration of VF was from 1 to 8 min (definition: 2-ry VF, fibrillation that occurs in patients with clinical signs of acute or chronic heart failure; 1-ry VF, in patients with the absence of these signs). Defibrillation was done with a biphasic quasi-sinusoidal shock through hand-held electrode paddles (12/12 cm diameter); the peak current (I [A]), delivered energy (DE [J]) and transthoracic impedance (TTI [Ohm]) were registered during the shock. VFF was estimated 5–7 s before the successful shock from surface ECG lead I or II.

Results A strong positive correlation between VFF (range 310–435 per min) and the value of the optimal defibrillation current (range 8–21 A) ($r=0.81$; $P<0.001$) was revealed in patients with

1-ry VF. The correlation coefficient between VFF and defibrillation energy (range 16–85 J) was less to some extent ($r=0.69$; $P<0.01$). There was no correlation in patients with 2-ry VF (range of VFF 200–410 per min; range of I (A) 9–40 A). Meanwhile, there was a significant negative correlation between TTI (range 22–117 Ohms) and the value of the defibrillation current, that ceased 2-ry VF ($r=-0.69$; $P<0.01$), and there was no significant correlation between TTI and I (A) in patients with 1-ry VF ($r=-0.32$, $P=0.11$).

Conclusions The obtained data suggest that the strong positive correlation between ventricular fibrillation frequency and defibrillation current value in patients with 1-ry VF is mainly related to electrophysiological heterogeneity of the myocardium. At the same time the influence of chest impedance on the value of the current depolarising critical amount of myocardium was, probably, insignificant. Fibrillation frequency obtained from the surface ECG predicts current and energy requirements in patients with primary VF undergoing external defibrillation.

P68 Post-resuscitation myocardial dysfunction: correlated clinical factors and prognostic implications

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Purpose To evaluate the clinical course of post-resuscitation LV dysfunction, clinical factors correlated with its severity, and the prognostic value in the survival outcome.

Methods Forty-two patients (26 men and 16 women) resuscitated from out-of-hospital cardiac arrest underwent echocardiographic evaluation of the LV systolic and diastolic functions 6 hours, 24 hours, 3 days, and 7 days after return of spontaneous circulation. The serial LV functions were analyzed in correlation to the event characteristics, resuscitation factors, and the patients' survival outcomes.

Results The LV fraction shortening and ejection fraction were impaired on the first day and improved gradually on serial followup. Isovolumic relaxation time (IVRT) lengthened gradually. Patients

with cardiac etiologies had worse LV systolic function on the first and third post-resuscitation days. Defibrillation and use of high doses of epinephrine during resuscitation were associated with poorer LV systolic function on day 1, while the effect of amiodarone persisted up to 3 days. In terms of the prognostic implications, initial rhythm of VT/VF, lower doses of epinephrine during resuscitation, and shorter IVRT at the 6th hour were correlated with better survival outcomes.

Conclusion LV function is impaired early in the post-resuscitation phase, and would recover gradually within the first 3 days. Several event and resuscitation factors are associated with this dysfunction. Once the patient survives the initial stage, the prognostic value of this transient phenomenon seems limited.

P69 The gamma isoform of enolase (NSE) is predictive of mortality after cardiopulmonary resuscitation (CPR): comparison with clinical neurologic examination and CT scan of the brain

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Introduction NSE (the gamma isoform of enolase) is released into the cerebrospinal fluid and blood after the occurrence of stroke and anoxia; and correlates with the extent and duration of ischemia in animal models of stroke and the outcome in humans, including neonates, with hypoxic ischemic encephalopathies.

Accordingly, the objective of the current study was: 1) To assess the prognostic significance of plasma concentrations of NSE for early prediction of outcome in patients at risk for anoxic encephalopathy after CPR. 2) To compare the prognostic information provided by NSE measurements with that provided by conventional risk indicators (clinical neurological examination and CT scan of the brain).

Results Ten patients (age 60.5 years [mean] \pm 20.8 [SD]) were enrolled up to now. In two patients CPR was performed due to ventricular fibrillation, in one due to low blood pressure during hemodialysis, in three due to acute myocardial infarction, in three

due to cardiac arrest for unknown reason and in one patient due to ketoacidotic coma. Clinical neurological examination, computed tomogram of the brain, and plasma concentration of NSE on the third day after CPR were compared. The clinical neurological examination was differentiated in standardized three levels of mid-brain syndrome (MBS) and three levels of bulbar brain syndrome (BBS). Four of the patients had a MBS I, one had a MBS II, two had a MBS III, and three had a BBS III at the third day after CPR. In three patients neurological examination was not reliable due to given anticonvulsive therapy because of early onset of myoclonias. The CT scan of the brain showed only in six patients cerebral edema; in two patients there was no CT scan available because of the deleterious hemodynamic situation; and in two patients ischemic lesions were found, but no edema. The NSE level was elevated in seven of 10 patients (61.0 \pm 65.1 ng/ml [range 7.2–194.6]). In three patients the level was normal. Surprisingly the low NSE level found in this patient was associated with a significant swelling due to cerebral edema documented by the neu-