

1027-91

A Comparison of Bedside B-Type Natriuretic Peptide Versus Echocardiographic Determination of Ejection Fraction in the Diagnosis of Heart Failure

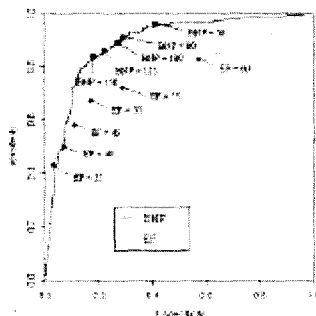
Philippe Gabriel Steg, Philippe Duc, Laurence Joubin, James McCord, William T. Abraham, Judd E. Hollander, Torbjorn Omland, Gabriel Baron, Marie-Claude Aurmont, France Mentré, Peter A. McCullough, Alan S. Maisel, BNP Multinational Study Investigators, Hôpital Richat, Paris, France, University of California, San Diego School of Medicine, Veterans Affairs Medical Center, San Diego, CA

Background: The emergency diagnosis of congestive heart failure (CHF) can be difficult. Echocardiography is often used to assess left ventricular (LV) function to attempt to identify patients with CHF. B-type natriuretic peptide (BNP) is an approved blood test for the diagnosis of CHF.

Methods: 1586 patients with acute dyspnea presenting to emergency departments underwent clinical, radiological and a point-of-care BNP assessment. CHF was adjudicated by two independent cardiologists, blinded to BNP. Of the 1586 patients, 709 underwent echocardiographic determination of LV ejection fraction (EF).

Results: A total of 69.4% had a final diagnosis of CHF. CHF patients were older (68.5 vs 61.6 years, $p < 0.0001$), had a lower EF (39.5 vs 56.1%, $p < 0.0001$) and a higher BNP (683 vs 129 pg/ml, $p < 0.0001$) than patients without CHF. Area under the receiver operating characteristic curve (AUC) curve was significantly higher for BNP (0.89) than for EF (0.78); AUC difference: 0.12, $p < 0.0001$ (Figure). Sensitivity (SE) of BNP for the diagnosis of CHF was 89%, specificity (SP) 73%, and accuracy was 84%. Values for EF $< 50\%$ were respectively SE 67%, SP 83%, and accuracy 72%. Logistic regression analysis showed that used alone (OR=17.7) or in combination with clinical (OR=34.1), ECG and CXR data (OR=32.1), BNP remained an independent predictor of CHF.

Conclusion: In this population, point-of-care BNP was superior to echocardiographic determination of EF in identifying patients with CHF, regardless of the threshold value.



1027-92

Correlation Between Troponin Values and Echocardiographic Findings in Children Following Global Ischemic Cardiac Arrest

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Background: Myocardial dysfunction occurs immediately after successful cardiac resuscitation. **Purpose:** To determine whether measurement of cardiac troponin in children with acute out-of-hospital cardiac arrest predicts the severity of hypoxic-ischemic myocardial injury and echocardiographic evidence of ventricular dysfunction. **Methods:** This is a prospective, observational study. Patients admitted to the Pediatric Intensive Care Unit (PICU) following an out-of-hospital cardiopulmonary arrest. Troponin measurements were obtained upon admission to the PICU, and again at 12, 24, and 48 hrs. Echocardiograms were performed within 24 hrs of admission. **Results:** 24 patients were enrolled. Survival to hospital discharge was 29% (7/24). The mean age was similar across both survivors and non-survivors. Mean downtimes were 15.0 ± 21.6 min (range 3 to 63 minutes) for survivors vs 34.6 ± 18.5 min (range 4 to 70 minutes) for the non-survivors ($p = 0.02$). Survivors received less number of epinephrine doses compared to non-survivors (1.3 ± 2.2 vs 2.9 ± 1.6 , $p = 0.02$). Only one patient required defibrillation for ventricular arrhythmia during resuscitation (non-survivor group). There is a negative association between ejection fraction and troponin measurements at 12 and 24 hrs ($r = -0.54$, $p = 0.01$ and $r = -0.59$, $p = 0.02$, respectively). This negative association is found between shortening fraction and troponin measurements at 12 and 24 hours ($r = -0.46$, $p = 0.03$ and $r = -0.65$, $p = 0.01$, respectively). The mean ejection fraction for survivors was higher than that of non-survivors (73.2 ± 11.2 percent versus 55.4 ± 19.8 , $p = 0.04$). This difference was also demonstrated for shortening fraction measurements (37.5 ± 7.8 percent versus 25.5 ± 10.7 , $p = 0.02$). **Discussion:** We report a correlation between troponin values and echocardiographic findings of ventricular dysfunction. This correlation is demonstrated in a pediatric population following global ischemic cardiac arrest. These patients were devoid of coronary artery disease or congenital heart disease.

1027-93

Successfully Teaching of Early Defibrillation in Primary School Children Using a Self Instruction Video

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Traditionally the training course for early defibrillation lasts between four to eight hours. However the Automatic External Defibrillator (AED) is a friendly device which can be used by all first responders, independently by their age or education, and most people can complete a self-paced training program by using a video playback.

Aim: We investigated the efficacy of a video-tape as a mean to teach the AED application technique in a mock cardiac arrest scenario. The first end-point was to calculate the time from opening the AED box to the first shock in a simulated ventricular fibrillation case in potentially first responders from an Italian Primary School. Secondly we evaluated the correctness of electrodes placement.

Method: One hundred and four children between 8 to 10 years of age participated to the study. After a brief theoretical introduction, a two minute video with a mock cardiac arrest scenario showing the application protocol of the AED was shown and repeated twice for each group of children. Then the children were divided into subgroups of three participants. An instructor assigned to each child a specific role: one simulated the patient in cardiac arrest, one checked the reactions, responsive, breathing and sign of circulation and applied the AED, one carried the AED device and simulated the phone call to 1-1-8, the Italian EMS number. All the three children turned in each role. The "application time" was calculated for each of the three performance from opening the AED to first shock. **Results:** Electrode placement was correct in 95% of cases. All children remained clear off the patient during shock delivery. The mean application time was: 1° performance: $100 + 20$ sec; 2° performance: $69 + 12$ sec, 3° performance $52 + 8$ sec. mean total time of application: $82.4 + 26$ sec (ranging from 58 sec to 134 sec).

Conclusion: A self instruction video is simple and low expensive method of learning and may represents an easy strategy to favor the widespread use of AED. It offers a valuable learning tool to teach AED also in children with no experience in first aid. Future work should assess the quality of the acquired skill in other populations of non conventional responders from the community.

1027-94

The Impact of Limited Bedside Echocardiography in an Acute Clinical Setting by Noncardiology Personnel With Compact Systems

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Background: Echocardiography (echo) can provide important information in a variety of acute clinical situations. Unfortunately, bedside physical exam skills have declined as medical technology has advanced resulting in an inadequate clinical assessment of the acute patient (pt). Limited echo's can be performed on compact, echo systems as an adjunct to the bedside exam. However, skepticism abounds whether these limited echo studies have value and if non-cardiology personnel can be trained in a reasonable time-frame to perform them. **Objectives:** To determine (1) if non-cardiologists can perform and interpret a limited echo on a compact system, and (2) whether limited echo can impact clinical management in an acute medical setting.

Methods: 4 intensivists and 4 medical students were trained to perform and interpret limited bedside echo's (parasternal long and short and apical 2 and 4 chamber; no Doppler) in a 2 1/2 day course. Pts were studied in the emergency department (120 pts) with the Cypress® laptop sized system (Acuson/Siemans) and the surgical ICU (74 pts) with the Sonoheart® hand-held system (Sonosite). Studies were immediately reviewed and repeated with full Doppler by an echo-cardiologist to determine if the limited echo's performed by the intensivists and students were technically diagnostic, interpreted accurately and had a clinical impact in the acute setting.

Results: Echo's were primarily performed for LV function and relative volume status. Non-cardiologists were able perform a limited echo in 190/194 pts (98%) whose mean weight was 87 kg (range 50-154 kg). Forty-six percent of echo's were abnormal and 54% were normal studies; 96% of their limited echo's were of diagnostic quality and 78% were interpreted accurately. Limited echo led to a change in pt diagnosis in 23% and altered therapy in 26% of pts. The mean echo acquisition time was 8.58 min. **Conclusion:** Physicians (non-cardiologists) and medical students can quickly perform and interpret limited bedside echo's in acute clinical situations on small echo systems. These limited echo's can significantly impact pt care in acute settings.

1027-95

Defibrillator Clocks Are Unable to Maintain Accurate Time Over a Three-Month Period

Carsten M. Schmalfuss, Christen Vanderhoef, Leah Carlson, Ahamed H. Idris, University of Florida, Gainesville, FL

Background: Collapse-to-first-shock time interval is the single most important determinant of survival in patients with cardiac arrest. American Heart Association guidelines recommend a collapse-to-first-shock interval of less than 3 minutes for in-hospital cardiopulmonary resuscitation (CPR) and assessment of this interval is a crucial first step to improve in-hospital CPR performance. At our hospital, time of first shock is determined with the defibrillator clock. Our Bioengineering Department routinely checks the defibrillators and adjusts the clocks every 6 months in a non-standardized fashion.

The objective of this study was to determine the accuracy of defibrillator clocks over a 3-month period.

Methods: Sixty-one defibrillators in patient care areas (7 different models from 3 different manufacturers) were evaluated. Defibrillator clocks were synchronized with the atomic clock in Boulder, CO and the time difference between each defibrillator and the atomic clock was recorded 3 months later. Mean time differences between defibrillator models were compared with the Kruskal-Wallis test.

Results: Complete data sets were available for 58 defibrillators; 3 had been replaced at follow-up. The mean (\pm SD) time difference between defibrillators and the atomic clock after 3 months was 1.50 ± 1.66 min (range 0 - 10 min). For each defibrillator model, the mean time difference after 3 months was 0.71 ± 0.63 min (Lifepack 9, N = 34), 1.60 ± 1.34 min (Lifepack 10, N = 5), 2.17 ± 1.33 min (Heartstream, N = 6), 3.33 ± 0.52 min (Lifepack 12, N = 6), 4.25 ± 4.03 min (HP Codemaster, N = 4), 2.00 ± 1.41 min (Zoll M, N=2) and 1.00 min (Lifepack 7, N=1). The Lifepack 9 defibrillator clocks had significantly less time change over 3 months than Heartstream, Lifepack 12 and HP Codemaster defibrillator clocks ($P < .0003$).

Conclusion: Defibrillator clocks are unable to maintain accurate time over 3 months. Without extra measures defibrillator clocks are too inaccurate to be used to assess collapse-to-first shock time interval.

POSTER SESSION

1028 Combined Procedure Outcomes in Coronary Artery Bypass Patients

Sunday, March 30, 2003, Noon-2:00 p.m.
McCormick Place, Hall A
Presentation Hour: Noon-1:00 p.m.

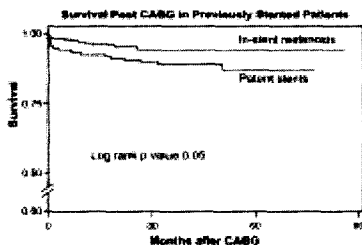
1028-96

Higher Mortality in Patients With Patent Stented Arteries Undergoing Coronary Artery Bypass Surgery

Niranjan Seshadri, Mehdi Shishshbor, Naveen Acharya, Marc A. Gillinov, Eugene H. Blackstone, Raymond Q. Migrino, Sasan Ghaffari, The Cleveland Clinic Foundation, Cleveland, OH

Aim: Current surgical practice is to bypass a previously stented artery even if it is patent. Does bypassing a patent stented artery affect outcome? We sought to compare outcomes of patients with patent stents (<50% stenosis) with those with in-stent restenosis (>50% stenosis) undergoing coronary artery bypass grafting (CABG) to the stented arteries.

Methods: From 1995 through 2001, 359 patients had coronary stents and CABG at our institution. Of these, 162 had patent stents and 197 had stents with in-stent restenosis that were bypassed. Patients in the 2 groups were similar with respect to age, left ventricular function, extent of coronary disease, time from stent to CABG and prevalence of diabetes, smoking, hypertension and renal insufficiency. Survival data was determined using Social Security Death Index. **Results:** At a mean follow up of 42 ± 18 months, there were 18 deaths in patients with patent stents and 11 patients with in-stent restenosis undergoing CABG. Kaplan-Meier analysis is shown in the figure ($p=0.05$).

**Conclusions:**

Patients with patent stents undergoing CABG to the stented vessel had a higher mortality than did similar patients with in-stent restenosis.

1028-97

Minimally Invasive Coronary Bypass Grafting of the Left Anterior Descending Coronary Artery Improves Myocardial Perfusion in the Nonrevascularized Second Vessel Territory in Two-Vessel Coronary Artery Disease

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Background: Although coronary bypass grafting and coronary angioplasty (PTCA) are equally effective to achieve target vessel revascularization in multivessel coronary artery disease (CAD), little is known on the long-term impact of minimally invasive coronary bypass grafting (MIDCAB) on myocardial perfusion in two-vessel CAD.

Methods: Thirty-one patients (age 63 ± 10 yrs) with two-vessel CAD of the left anterior descending coronary artery (LAD) and the left circumflex ($n=18$) or right coronary artery ($n=13$) were studied by stress/rest perfusion SPECT. Perfusion was scored in a 18-segment model from 1 (normal) to 4 (absent uptake); percent extension and severity of perfusion defects were evaluated in the territory of the LAD and of the stenotic 2nd vessel. Quality of life was assessed by the SF-36 questionnaire. All patients underwent MIDCAB of the LAD, alone in 12 cases (Gr 1), or coupled to PTCA and stenting of the 2nd vessel in 19 (Gr 2). Clinical follow-up, SF-36 and SPECT were repeated 12 months after surgery.

Results: Baseline variables were not different in the 2 groups. During 12-month follow-up, no cardiac events occurred and significant improvement was observed versus baseline. SF-36 score increased from 102 ± 23 to 131 ± 12 in Gr 1 ($p=0.004$) and from 93 ± 21 to 131 ± 13 in Gr 2 ($p=0.0001$). Stress perfusion defects extension in the LAD territory

decreased from $77 \pm 20\%$ to $30 \pm 37\%$ in Gr 1 ($p=0.003$) and from $68 \pm 29\%$ to $13 \pm 19\%$ in Gr 2 ($p=0.0001$). Stress perfusion defects extension in the 2nd vessel territory decreased from $48 \pm 17\%$ to $20 \pm 23\%$ in Gr 1 ($p=0.005$) and from $55 \pm 18\%$ to $21 \pm 21\%$ in Gr 2 ($p=0.0004$). Severity score decreased from 2.02 ± 0.75 to 1.53 ± 0.70 in Gr 1 ($p=0.002$) and from 2.17 ± 0.55 to 1.17 ± 0.24 in Gr 2 ($p=0.0001$) for the LAD territory. It decreased from 1.96 ± 0.38 to 1.35 ± 0.49 in Gr 1 ($p=0.002$) and from 2.02 ± 0.50 to 1.31 ± 0.53 in Gr 2 ($p=0.0005$) for the 2nd vessel territory. No between-group difference at 12 months was significant.

Conclusion: In patients with two-vessel CAD, at 12 months after MIDCAB of the LAD, myocardial perfusion shows a similar sustained improvement both in the LAD and in the 2nd vessel territories, irrespective of revascularization by PTCA.

1028-98

Is Endoaneurysmorrhaphy Superior to Linear Suture for Left Ventricular Aneurysm Repair?

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Objectives: Endoaneurysmorrhaphy (EA) has been proposed as a more physiologic repair of postinfarction left ventricular aneurysm (LVA) than is linear repair. The aim of the present study was to evaluate early and late results of 2 different surgical techniques for the LVA repair (EA versus linear closure [LC]).

Methods: Between November 1993 and November 2001, 112 patients (pts), 90 males (80%), underwent surgical repair for LVA. EA (Group A) was employed in 69 pts (61.6%) and LC (Group B) in 44 patients (38.4%). Clinical outcomes and echocardiographic measurements of Group A were compared with those in Group B.

Results: Mean follow-up time is 44.5 ± 33.1 months. Preoperatively NYHA class, left ventricular (LV) ejection fraction (EF) and LV end-diastolic diameter were similar. Early overall mortality rate was 4.4%. Early postoperative increase in LVEF was greater after EA (4.6 ± 7.3 vs 0.6 ± 6.1 , $p=0.015$). Functional status improvement was significant for all the pts despite the different repair technique used ($p=0.0001$) as perhaps the LVEF increase ($p=0.0002$). There were no differences between the 2 groups for the NYHA class (change in NYHA class -1.3 ± 0.9 in Group A and -1.2 ± 0.8 in Group B, $p=0.479$) and for the LVEF (37.2 ± 8.7 vs 37.9 ± 9.3 , $p=0.721$). The actuarial survival rate at 5 years were $78 \pm 7\%$ for Group A and $85 \pm 7\%$ for Group B ($p=0.479$). Comparison with LogRank test revealed no significant difference in cardiac death between 2 groups ($p=0.148$). A preoperative NYHA class $>II$ ($p=0.018$) and a LVEF $<35\%$ ($p=0.005$) were associated with a higher incidence of early and late mortality.

Conclusions: LVA repair is an important therapeutic intervention. Both EA and LC appear extremely safe and efficacy showing a low operative mortality. Long term outcome resulted substantially similar for both repair methods. The surgical "combined" approach permits a better outcome for pts undergoing LVR

POSTER SESSION

1048 Inflammation and Other Novel Biomarkers in Acute Coronary Syndromes

Sunday, March 30, 2003, 3:00 p.m.-5:00 p.m.
McCormick Place, Hall A
Presentation Hour: 3:00 p.m.-4:00 p.m.

1048-89

Multiple Complex Unstable Plaques Associated With Systemic Inflammation and Adverse Cardiovascular Outcomes

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Background: Recent observations demonstrate that patients with acute coronary syndrome (ACS) often harbor multiple unstable plaques, consistent with the concept that destabilizing processes such as inflammation may exert adverse influence throughout the coronary bed. This study was designed to determine whether there is a relationship between the presence and magnitude of systemic inflammation, the number of unstable complex lesions (CL) and adverse cardiovascular events. **Methods:** In 283 patients with ACS undergoing coronary angiography, we analyzed the association between the number of CL, systemic marker of inflammation (high sensitivity C-reactive protein, CRP) and major adverse cardiovascular events (MACE) at one year (cardiac death, non-fatal MI and revascularization). Univariate and multivariate analysis were performed. **Results:** A single CL was present in 32% of pts, multiple CL were identified in 23% and no CL were documented in 45% of cases. There was a direct association between increasing number of CL and increments in systemic marker of inflammation (in pts. with none, one and multiple CL, CRP = 0.22, 0.53 and 1.85 mg/d, $p < 0.0001$). On multivariate analysis, CRP was independently associated with the presence of multiple complex coronary lesions ($p < 0.0001$). At one year follow up, major adverse cardiac events were reported in 24% of cases (death in 5.7%, MI in 3.9%, and revascularization in 17.7%). On multivariate analysis, only the presence of multiple CL (HR 2.88, $p=0.0007$) and history of congestive heart failure (HR 2.57, $p=0.037$) were independent predictors of MACE at 1 year

Conclusions: These findings demonstrate a strong association between the presence of multiple complex unstable plaques, the magnitude of systemic inflammation and adverse clinical outcome.