POSTER SESSION

1014 Heart Failure: Novel Methods/Insights

Sunday, March 17, 2002, 9:00 a.m.-11:00 a.m.
Georgia World Congress Center, Hall G
Presentation Hour: 9:00 a.m.-10:00 a.m.

1014-151 Reliability of Noninvasive Cardiac Output Measurement by Whole-Body Electrical Bioimpedence: Comparison to Thermodilution in Diverse Clinical Settings

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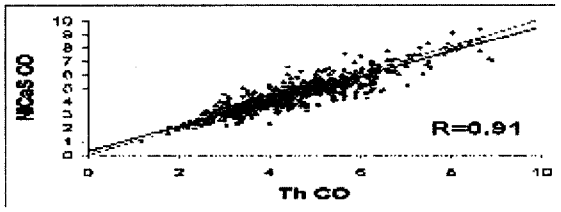
Non-invasive measurement of cardiac output (CO) is a promising alternative to thermodilution. The NICaS 2001 system is an innovative device for measuring continuous non-invasive CO based on whole-body electrical bioimpendence and analysis of impulse with a novel semi-empirical formula correcting for age, sex and body composition. The purpose of the study was to determine its reliability in diverse medical settings.
Methods: One hundred and fifty patients (with acute congestive heart failure (CHF) - 29, during and after coronary bypass surgery(CABG)-81, during coronary catheterization-40), underwent overall 542 simultaneous paired, independent measurements of cardiac output (CO) by NICaS 2001 (NiCAS-CO) and thermodilution (Th-CO).
Results: We have found good agreement between NiCAS-CO and Th-CO: Linear regression is r=0.91(p<0.05). Bias (mean between-method difference) is -0.03 L/min. and precision (bias +/- 2SD) is -1.45 to +1.37 L./min. This correlation is maintained throughout the different clinical settings and in a wide range of CO measurements (Figure). The correlation is r=0.86 in patients with acute CHF, 0.94 during coronary catheterizations and 0.9 during and after CABG.
Conclusions: For cardiac and cardiac surgery patients, NiCAS-CO measurement using whole-body bioimpendence is accurate. This may have important application for non-invasive on-line monitoring and treatment for such patients.



1014-152 Reliability of Noninvasive Cardiac Output Measurement by Whole-Body Electrical Bioimpedence in Patients Treated for Acute Congestive Heart Failures

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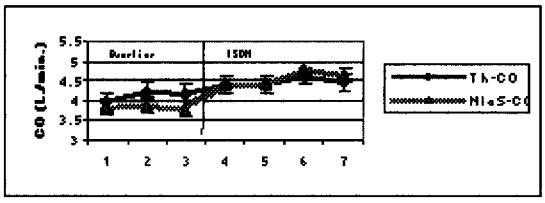
The NICaS 2001system is a new device for non-invasive, continuous measurement of cardiac output (CO) based on whole-body electrical bioimpendence and analysis of impulse with a novel semi-empirical formula correcting for age, sex and body composition. We evaluated its reliability in monitoring patients with acute congestive heart failure (CHF).
Methods: Thirty patients submitted for invasive hemodynamic monitoring with Swan-Ganz catheters due to acute CHF where enrolled in this study. CO was measure repeatedly, simultaneously and independently by NICaS 2001 (NiCAS-CO) and thermodilution (Th-CO). For each patient we obtained 3-4 measurements while under stable medical treatment. In 12 patients we also obtained 4 measurements per patient, while treatment with IV vasodilators (Isosorbide-dinitrate, ISDN) was initiated.
Results: Out of 30 patients, 10 where monitored while mechanically ventilated and 2 while treated by IABP. We have found good agreement between NiCAS-CO and Th-CO: Linear regression is r=0.86 (p<0.05). Bias (mean between-method difference) is -0.05 L/min. and precision (bias +/- 2SD) is -1.35 to +1.27 L./min. In the subgroup of patients monitored while treated with IV ISDN, The NICaS 2001 system correctly detected the CO increase induced by ISDN (R=0.95, P<0.05, Figure).
Conclusions: NICaS 2001 is reliable for monitoring CO in patients admitted due to acute CHF.



1014-153 Accuracy and Reproducibility of Noninvasively Determined Left Ventricular End Diastolic Pressure in the Catheterization Laboratory and the Office Setting

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Background: We have previously reported that VeriCor,® a noninvasive system that analyzes the arterial pressure decline during a Valsalva maneuver, can be used to measure left ventricular end diastolic pressure (LVEDP).
Methods: In order to assess the accuracy and reproducibility of the results we tested VeriCor in the catheterization laboratory in patients during elective left heart catheterization and in the office setting in cardiac patients during outpatient evaluations. Paired LVEDP measurements by invasive left heart catheterization and VeriCor methods were obtained in the catheterization laboratory (N=20) and by VeriCor in the office-setting (N=76) by sequential testing (Tests 1 and 2).
Results: Results show that VeriCor measurements of LVEDP in the catheterization lab correlate well (r = 0.90) with catheter measured LVEDP and that sequential VeriCor tests in the office-setting correlate well with each other (r = 0.80)
Conclusion: VeriCor can accurately and reproducibly measure LVEDP and can be used in the office setting for management of cardiac patients.

1014-154 Ventricular Interaction Impacts Left Ventricular Systolic Function in Heart Failure

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BACKGROUND. In the normal heart, ventricular interaction can impact left ventricular (LV) systolic function, but its effect in heart failure is unclear.
METHODS. We used echocardiography during lower body negative pressure (LBNP) (-15 mmHg) to study ventricular interaction in 20 heart failure patients (ejection fraction <.40 prior to beta blocker therapy). Of these, 25% had restrictive filling (REST)(deceleration time <140 ms).
RESULTS. Comparing REST to non REST patients, there was no significant difference in mean ejection fraction or LV size. With LBNP, there was no significant change in LV end-diastolic volume for either group. Both REST and non REST patients showed no difference in LV free wall systolic function (change in shortening 10 mid free wall chords) (see figure). Septal diastolic loading (end-diastolic chord length) tended to decrease in REST (sum 10 chords, 36.6 to 35.7 cm), and increase in non REST (35.9 to 36.9 cm), p=.06. Changes in septal systolic motion were also opposite, with systolic shortening decreasing in REST (sum 10 chords 7.2 to 5.7 cm), and increasing in non REST (6.0 to 6.6 cm), (p<.004). LV ejection fraction was impacted by altered septal mechanics. The change in ejection fraction with LBNP was -7 points in REST, but only -2 points in non REST (p<.05).
CONCLUSION. In heart failure, restrictive filling predicts altered septal mechanics. This ventricular interaction is associated with a drop in LV ejection fraction with decreased central volume.