Reliability of Noninvasive Cardiac Output Measurement by Whole-Body Electrical Bioimpedance: Comparison to Thermodilution in Diverse Clinical 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 $-1.35$ to $+1.27$ L/min. In the subgroup of patients with acute CHF, 0.84 during coronary catheterizations and 0.9 during and after CABG.

**Conclusions:** For cardiac and cardiac surgery patients, Nicas-CO measurement using whole-body bioimpedance is accurate. This may have important application for non-invasive on-line monitoring and treatment for such patients.