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SESSION TITLE: IMPROVING QUALITY OF CARE

Abstract 11939: Validation of Non-invasive Cardiac System (NICaS) Derived Stroke Volume With Cardiac Magnetic Resonance

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Abstract

Introduction: Assessment of cardiac output (CO), a product of stroke volume (SV) and heart rate, plays an important role in the management of critically ill patients. Currently, these hemodynamic parameters can be obtained using transthoracic echocardiography, cardiac magnetic resonance (CMR) imaging, and/or invasive cardiac catheterization; each modality has its own limitations. Non-Invasive Cardiac System (NICaS, NI Medical) provides various hemodynamic parameters using whole body impedance cardiography.

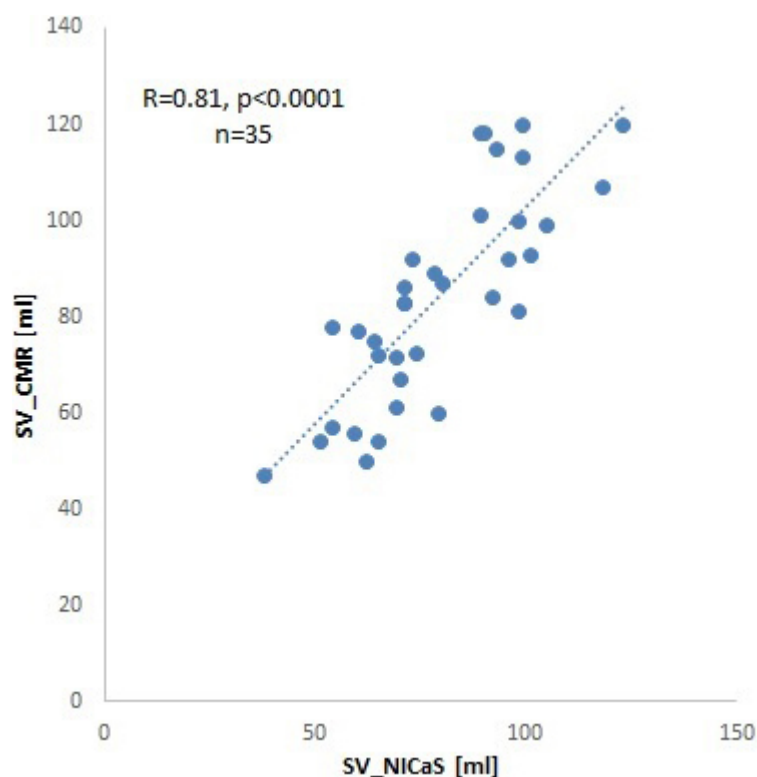
Objective: To validate NICaS derived stroke volume with that from CMR, a gold standard technique.

Methodology: A total of 35 consecutive patients undergoing CMR, were evaluated by NICaS, 15-minutes after CMR. Of these, 10 patients were also evaluated by NICaS 15-minutes pre-CMR to determine internal validation of the NICaS technology.

Results: The study population included 35 patients [23/35 (66%) males] with a mean age of 53 ± 14 years. They were investigated for a range of cardiac diagnoses; hypertrophic cardiomyopathy was the most common condition, followed by arrhythmogenic right ventricular cardiomyopathy and congenital heart diseases. CMR derived mean SV was 84 ± 4 ml (median: 83 ml, range: 47-120 ml),

whereas the SV from NICaS was 79 ± 3 ml (median: 74 ml, range 38-123 ml). The SV measured using both of these methodologies were strongly correlated with a $r=0.81$ ($p<0.0001$) (Panel-A). A Bland-Altman plot for SV correlation demonstrated bias of -4.7 ml with upper and lower limits of agreements of +20 and -30 ml respectively. NICaS demonstrated strong intra-patient reliability when calculating SV, with kappa value of 1. Such a degree of agreement falls within an acceptable range, allowing NICaS derived SV to be comparable with the one derived by CMR.

Conclusion: Stroke volume measured using NICaS strongly correlated with that from CMR. NICaS also demonstrated strong consistency in SV derived at different time points in the same individual.



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