Author’s response to reviews

Title: Flow-volume loops derived from three-dimensional echocardiography: a novel approach to the assessment of left ventricular hemodynamics

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Author’s response to reviews: see over
We would be most grateful if you would consider our manuscript entitled "Monitoring of acute load and contractility changes by left ventricular pressure measurements" for publication in Cardiovascular Ultrasound.

We certify hereby that: (i) there are no commercial or other associations that might pose a conflict of interest in connection with the submitted paper, (ii) all authors have read and approved the manuscript, and that: (iii) no part of this work (excluding abstracts) has been published previously or is currently under consideration for publication elsewhere.

This study explores: (i) the feasibility of non-invasive evaluation of left ventricular flow (LV)-volume dynamics using 3-dimensional (3D) echocardiography, and (ii) the capacity of such an approach to identify altered LV hemodynamic states caused by valvular abnormalities such as aortic and mitral stenosis. The study describes further development of the concept of continuous non-invasive monitoring of flow-volume relationship during cardiac cycle as a tool in the evaluation of LV hemodynamics. The original concept presented by our group (Söderqvist et al., Cardiovasc. Ultrasound 2006; 4:40) was based on 2-dimensional (2D) echocardiographic imaging and consequently, only estimates of LV volumes and flows could be used for construction of flow-volume loops. In the present study, the LV volumes were measured directly using 3D echocardiography, thereby bypassing inherent limitations of the 2D volume calculations. LV flow was then calculated as the first derivative of the LV volume. A flow-volume loop thus constructed can be expected to provide much more reliable information about the dynamics of changes in LV volume and concomitant changes in the flow into and out of the left ventricle during cardiac cycle and the approach provides a unique opportunity to evaluate these relationships in an entirely non-invasive way. The method has a potential to provide additional hemodynamic information in the evaluation of cardiac and valvular function.