Novel ultrasound-contrast-agent dilution method for assessment of left ventricular ejection faction

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Echocardiography: Stress, Contrast and Cardiac Function I

Abstract 2340: Novel Ultrasound-Contrast-Agent Dilution Method for Assessment of Left Ventricular Ejection Fraction

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Background: Left ventricular ejection fraction (LVEF) is an important determinant of prognosis. We evaluated the accuracy of a novel fast method for LVEF quantification based on indicator dilution curve (IDC) principles (figure 1) and compared the results with contrast-enhanced biplane LVEF assessment.

Method: a 10 ml diluted (1:100) ultrasound-contrast bolus (SonoVue ®) was injected intravenously in thirty patients (pts) (20 male, age 65 ± 10) with known or suspected heart disease. In 22 pts multiple recordings were made and in 12 pts injections were repeated after implantation of a biventricular pacemaker, leading to 68 measurements. The developed algorithm used the left atrium and LV IDC for the LVEF measurement. For the biplane enhanced LVEF measurements a 0.5 ml pure ultrasound-contrast bolus (SonoVue ®) was administered to obtain multiple four- and two-chamber recordings.

Results: according to contrast enhanced biplane assessments, the LVEF ranged from 10 to 75 % while the LV end-diastolic volume ranged from 80 to 521 ml. The mean LVEF measured by the biplane and the IDC method was 33 ± 17 % and 35 ± 18 %, respectively. A correlation coefficient r=0.91 was observed between the two methods (figure 2).

Conclusion: A new fast method for LVEF assessment based on IDC principles is described and comparison with contrast enhanced biplane LVEF quantification shows accurate results. The proposed method also allows simultaneous quantification of right ventricular EF based on the same IDC principles.