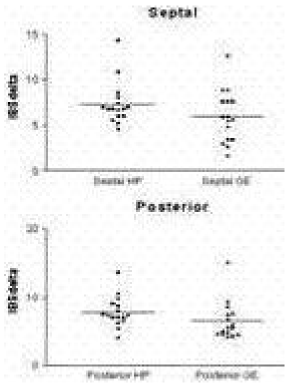
septal CV (±SD) with the Philips-HP 5500 system vs the GE-Vivid 7 system was 7.3±2.3 dB vs 6.0±2.9 dB respectively, p=0.2 and mean posterior CV (±SD) was 7.8±2.2 dB vs 6.6±2.8 dB, p=0.2 (see graph; IBS delta equals CV).
Conclusion: These two image acquisition and analysis systems offer comparable results for the measurement of integrated backscatter cyclic variation. No significant differences were observed between the two methods making the measurement of IBS more readily available in echocardiogram labs with standard analysis software.



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Isovolumic acceleration measured by tissue Doppler echocardiography is preload independent in healthy subjects

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Background: Isovolumic acceleration (IVA) as assessed by Tissue Doppler Imaging has been proposed as a preload independent measure of left ventricular (LV) contractility. A problem with previous measurements for contractility has been preload dependency. We investigated the impact of increased pre-load on IVA measured by Tissue Doppler in healthy volunteers.
Methods: Seventeen young healthy individuals, 13 (76%) male, age 31±9 years, had a Tissue Doppler echocardiographic study of left ventricular lateral wall performed at baseline and after a rapid infusion of 30 ml/kg of bodyweight of isotonic saline within 15 minutes. Results are given as mean±SD, differences tested by paired t-test.
Results: The subjects had a mean of 2,253±398 ml (29.6±2.3 ml/kg bodyweight) of saline infused within 15 minutes. Echocardiographic estimates of filling pressure, such as E/e' and the left atrial diameter increased significantly with increased preload. Left ventricular outflow tract VTI increased significantly and systolic velocity basal decreased. See Table. Systolic and diastolic blood pressure remained stable (115±13/78±9 at baseline to 113±13/76±7 after saline infusion, NS), indicating that after-load remained unchanged. IVA did not change regardless of measured in the basal free wall or in the mitral annulus. See Table. Peak systolic strain or strain rate measured at the basal segment of left ventricular lateral wall did not show any significant changes either.
Conclusion: Preload increase does not affect Tissue Doppler measurements of IVA in healthy individuals.

Table 1

(paired)	Baseline	Saline	P-value
MV E/e?, septal annulus	7±2	9±2	<0.01
Left atrium, end-systolic diameter (cm)	3.2±0.5	3.4±0.5	<0.05
LV outflow tract VTI (cm)	25±4	28±3	<0.05
Systolic velocity basal (cm/s)	8.3±1.6	7.0±1.8	<0.05
IVA, annulus (m/s²)	1.3±0.5	1.4±0.6	NS
IVA, basal (m/s²)	1.0±0.5	1.1±0.4	NS

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Normal heart with a systolic twist - a 2D-strain study

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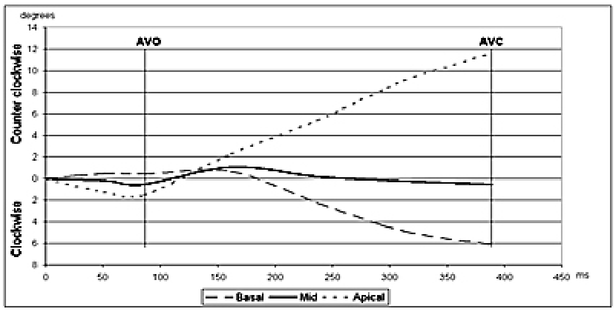
Background: The muscle fibres of the left ventricle (LV) are mainly directed longitudinally and spirally which gives the left ventricle a twisting motion during contraction. By using a new echocardiographic technique, 2D-strain, circumferential rotation of the LV can be assessed.
Aim: To describe the systolic circumferential rotation at three levels of the LV by measuring the rotation at aortic valve closure (AVC), the peak rotation and the time to peak rotation.
Method: Forty healthy individuals, (18 men) with mean age 60±14 years were examined. 2D-short axis images of the LV at basal, papillary and apical levels were recorded. Circumferential rotation was calculated using an automatic speckle tracking system (2D-strain, Echopac, GE). The time to peak systolic rotation was measured from the Q-wave in the ECG (Q).
Results: A total of 89% of the analysed segments were accepted. Basal rotation at AVC was 6.1°±4.8° clockwise with a peak rotation of 6.6°±4.5° at 377 ms from Q. Rotation at the papillary level at AVC was 0.6°±3.5° clockwise. Apical rotation at AVC was 11.6°±4.6° counter clockwise with peak rotation of 12.5°±4.8° at 391 ms from Q. There was no significant difference in time to peak rotation between basal and apical level. Time to AVC was 389±21 ms.
Conclusion: The study shows opposite directions of systolic rotation at basal and apical levels, with approximately twice the degree of rotation at the apical level. Average rotation at the papillary level is close to zero. Peak systolic rotation occurs near the aortic valve closure in both basal and apical segments, showing a coordinated contraction pattern. This method is feasible and may be a very useful tool in evaluating LV function. However, further studies focussing on different pathological cardiac conditions are needed.



MYOCARDIAL VELOCITY IMAGING (DMI) – OTHER

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Relation between Aortic Valve Closure by high frame rate B-mode and end systolic events in Tissue Doppler velocity/time curves

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Purpose: There is no common consensus concerning the exact timing of Aortic Valve Closure (AVC) in tissue Doppler (TDI) velocity/time curves. The aim of this study was to compare AVC in high frame rate B-mode images with simultaneously recorded TDI velocity/time curves.
Methods: 11 healthy male subjects were examined using the M3S probe on a Vivid 7 (GE Vingmed Ultrasound) scanner. To achieve high frame rates the scans were limited to a narrow sector covering the septum and the aortic valve. B-mode and TDI frame rates were set to be equal. All analysis was performed using the GcMat (GE Vingmed Ultrasound) ultrasound analysis software. The time point of AVC in B-mode images was found by identifying the first frame where the aortic valve was closed. TDI velocity/time curves from basal septum were extracted and four candidate time points of the curves were identified and compared to B-mode AVC: A, the first time point of negative velocities after ejection, B, the peak negative velocity after ejection, C, the time point close to peak positive acceleration where the curve crosses zero, D, the time point of peak positive acceleration after ejection.
Results: Mean frame rate was 147.5 frames/s in both B-mode and TDI. 73 recordings were analyzed. Candidates A, B and D were found in all curves, C was detected in 47 curves. Mean differences ± std. dev. between B-mode AVC and TDI candidates: A 23.8±7.3 ms., B 4.8±6.4 ms, C -1.5±8.9 ms., D -0.7±8.6 ms.
Conclusion: The candidate TDI AVC time point in velocity/time curves that best matched the time point of AVC in B-mode images was the time point of peak positive acceleration (D).