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Limitations of Valsalva maneuver to detect pseudonormal transmitral filling pattern: a study of healthy individuals.

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Background: Pseudonormal (PN) mitral filling pattern represents a moderate diastolic dysfunction in which an abnormal relaxation is compensated by an elevated atrial pressure. Inversion of the mitral E/A ratio during Valsalva maneuver (VM) is a method recommended to identify a PN filling pattern. Sparse data are available on the effects of this maneuver in healthy asymptomatic middle-aged individuals in whom baseline E/A ratio is close to 1.

Aim: To evaluate the effects of changes in loading condition with VM on the pattern of Doppler mitral velocity profile in middle-aged healthy individuals.

Methods: We studied 30 (23 men, 5.0±1.4 years, 42-58) healthy individuals without any overt cardiovascular disease or vascular risk factor. Peak velocity of early (E) and late (A) mitral waves and their ratios at rest and during VM as well as left ventricular ejection fraction (LVEF) were measured by standard techniques. Early (Ea) and late (Aa) myocardial velocities were obtained by pulsed tissue Doppler imaging (TDI) at the lateral and septal mitral annulus.

Results: Measurements were feasible in all subjects. All had normal LVEF (64±5%).

<table>
<thead>
<tr>
<th>Rest</th>
<th>VM</th>
<th>P</th>
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<tr>
<td>Heart rate (beats/min)</td>
<td>63 ± 10</td>
<td>73 ± 10</td>
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<tr>
<td>E (cm/s)</td>
<td>68.5 ± 8.4</td>
<td>73.6 ± 7.1</td>
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<tr>
<td>A (cm/s)</td>
<td>55.1 ± 6</td>
<td>49.9 ± 8.7</td>
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<tr>
<td>E/A</td>
<td>1.25 ± 0.14</td>
<td>0.76 ± 0.12</td>
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Nine subjects had an abnormal relaxation filling pattern (E/A < 1), E, A and E/A significantly decreased with VM. Inversion of E/A was observed in 20 of 21 (95%) subjects with a baseline E/A < 1, leading to a pseudonormal classification according to VM pattern (table). However, all had Ea > 8 cm/s (E sept 10.5±1.1 cm/s, E lat 15.2±2.19 cm/s) and E/A < 10 (E/EA sept 4.6±0.9, E/EA sept 6.6±1.4).

Conclusion: Onset of E/A ratio during VM does not differentiate between normal and pseudonormal LV filling patterns in normal subjects. The use of this single method could lead to misleading results when applied to detect early manifestation of several cardiomyopathies.

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Left ventricular diastolic function as routinely reported in a tertiary referral center: analysis of 3227 exams.

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Abstracts related to left ventricular (LV) "diastology" (analysis of filling pressures and chamber compliance) presented at scientific meetings have paralleled increased use of the Doppler techniques, but feedback of proposed algorithms to estimate (LV) diastolic function on the "real world" of clinical diagnosis is unknown.

Aim: To analyse effective use of LV diastolic function analysis during routine echocardiographic outpatient studies in a tertiary referral center.

Methods: We selected 3227 consecutive reports (outpatient studies) generated between October 1999 and 2000 by 6 ASE level III, 5 level II and 3 level I (referred center: analysis of 3227 exams). Each exam included complete M-Mode, LV biplane volumes and ejection fraction, and pulsed Doppler mitral and aortic velocity-time integral ratio (VTI), and the three (strings in comments: "diastolic function", "filling pressure", "compliance", "restrictive") descriptions related to LV diastolic assessment.

Results: Text descriptions of LV diastolic function were found in 51%, 19% and 43% of reports of level I, II and III operators. In patients with "cardiomyopathy", text descriptions were found in 29%, 64% and 60% of reports of level I, II III operators. In this same subset, LV biplane end-diastolic volume, mitral E/A ratio and E deceleration time were reported by respectively 86%, 14% and 14% of level I; 47%, 35% and 40% of level II; and 51%, 32%, and 37% of level III operators. Finally, in patients with reduced ejection fraction (>45%), text descriptions of LV diastolic function were found in 47% of all reports, whereas measurements of LV biplane end-diastolic volume, mitral E/A and E deceleration time were found respectively in 62%, 25% and 30% of all reports.

Conclusion: in the "real world" of diagnostic echocardiography, even expert cardiologists assess simple indexes of LV diastolic function in less than half of the patients in whom they are recommended as mandatory (cardiomyopathy or LV systolic dysfunction). These results suggest that in echocardiographic diastology, there exists a feedback gap between research findings and clinical applications of these findings.