Segmental Diastolic Dysfunction of Left Ventricular Wall in Patients with 50% Coronary Artery Stenosis

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Purpose

Coronary artery stenosis is known to cause segmental diastolic dysfunction of the left ventricular wall.

However, the degree of stenosis necessary to cause diastolic dysfunction is unknown.

We utilized strain rate profile of resting echocardiography to investigate the segmental diastolic dysfunction of patients with various degrees of coronary artery stenosis.
Patients

Total patients: 126 patients who had undergone CAG.

25% CAS (24 seg.) (gr-S1): 22 pt.
50% CAS (32 seg.) (gr-S2): 20 pt.
75% CAS (26 seg.) (gr-S3): 20 pt.
90% ≤ CAS (21 seg.) (gr-S4): 21 pt.

Variables Employed to Evaluate Segmental Myocardial Diastolic Function

Peak E (1/s peak speed of active self-extension of myocardium of the segment)

E/E time (1/s² averaged acceleration rate of active self-extension of myocardium of the segment)
Strain Rate Profile

Aortic Valve Closure Time

Peak E

Peak E (1/s) :

Peak E/E time (1/s²) :

Diastolic period
B - 1

Normal LAD

Peak E: 5.04
Peak E/E time: 28.04
LAD #7  25% stenosis
LAD #7  50% stenosis

Peak E: 1.35
Peak E/E time: 9.50
Peak E: 0.71
Peak E/E time: 4.90
LAD #7 75% stenosis
LAD #7 90% stenosis

Peak E : 0.66
Peak E/E time : 2.20
## Results of Peak E & Peak E/E time

<table>
<thead>
<tr>
<th>stenosis</th>
<th>gr - N</th>
<th>gr – S1</th>
<th>gr – S2</th>
<th>gr – S3</th>
<th>gr – S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>normal</td>
<td>25 %</td>
<td>50 %</td>
<td>75 %</td>
<td>90 %</td>
<td>≤</td>
</tr>
</tbody>
</table>

### Peak E (1/s)

<table>
<thead>
<tr>
<th>values</th>
<th>1.85±0.34</th>
<th>1.75±0.48</th>
<th>1.34±0.50</th>
<th>1.13±1.85</th>
<th>1.03±0.21</th>
</tr>
</thead>
<tbody>
<tr>
<td>p &lt;</td>
<td>N.S.</td>
<td>p &lt; 0.05</td>
<td>p &lt; 0.001</td>
<td>p &lt; 0.001</td>
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</tbody>
</table>

### Peak E/E time (1 / s²)

<table>
<thead>
<tr>
<th>values</th>
<th>17.23±10.27</th>
<th>15.22±8.23</th>
<th>10.11±4.57</th>
<th>7.28±2.26</th>
<th>6.67±2.86</th>
</tr>
</thead>
<tbody>
<tr>
<td>p &lt;</td>
<td>N.S.</td>
<td>p &lt; 0.01</td>
<td>p &lt; 0.001</td>
<td>p &lt; 0.001</td>
<td></td>
</tr>
</tbody>
</table>

unpaired t test
Myocardial Contrast Echocardiography (MCE) with Levovist: Apex 2ch

CAG (LCA)

LAD #6 50% stenosis

The subendocardial layer of the anterior wall (right side) of the LV was imaging defect. This suggests that ischemia could exist in LAD area.
Conclusion

In 50% coronary artery stenotic area, segmental diastolic dysfunction was detected. Although 50% coronary artery stenosis is not thought to cause myocardial ischemia, the MCE shown above suggested existing ischemia. This diastolic phenomenon may be an early sign of myocardial ischemia.

Patients with 50% coronary artery stenosis should undergo further hemodynamic testing to evaluate for diastolic dysfunction.