The Effect of Aortic Valve Replacement on Coronary Flow Reserve in Patients With Hemodynamically Significant Aortic Stenosis and Normal Coronary Anatomy

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Background: Reduced coronary flow reserve (CFR) is an important cause of myocardial ischaemia in patients (pts) with hemodynamically significant aortic stenosis (AS) and normal coronary arteries.

The aim of the present study was to examine the effect of aortic valve replacement (AVR) on left ventricular myocardial ischaemia (LVMI), CFR and clinical symptoms after 1 year follow-up in pts with significant AS, normal coronary angiography and normal resting left ventricular function.

Patients and methods: Sixteen patients (9 women and 7 men; mean age 66±7) were enrolled into the study. All patients underwent 2 months before and 1 year after the AVR a complete transesophageal echo study and CFR measurement by transesophageal echocardiography (TEE). Coronary flow velocity was obtained by pulsed Doppler during TEE in the proximal left anterior descending artery. CFR was assessed with intravenous dipyridamole (0.56 mg/kg over 4 minutes) as a vasodilator agonist. CFR was calculated as the ratio of maximal averaged peak diastolic flow velocities (APV) at baseline and APV. Results are presented in the table.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Before AVR</th>
<th>After AVR</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVMI (g/m2)</td>
<td>183.8±56.6</td>
<td>128.6±31.4</td>
<td>0.002</td>
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<tr>
<td>CFR</td>
<td>3.9±5.54</td>
<td>2.5±1.79</td>
<td>0.03</td>
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<tr>
<td>Peak AOS gradient (mm Hg)</td>
<td>94±25</td>
<td>25±8</td>
<td>0.001</td>
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<tr>
<td>Effort angina</td>
<td>7.18 (44%)</td>
<td>11.76 (6%)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Conclusion: In patients with aortic stenosis and normal coronary arteries, the symptomatic improvement 1 year after AVR is accompanied by the rise of CFR, possibly due to the reduction of LVMI.

1211-53

Physiological Severity of Total Occlusion in the Coronary Artery Detected by Transesophageal Doppler Echocardiography at Rest: Diastolic Reverse Coronary Flow Versus Exercise 201-TI Single Photon Emission Computed Tomography

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Background: One of the angiographic characteristics of occluded coronary artery is a reverse flow from collaterals. Currently, coronary arteries can be detected by transthoracic Doppler echocardiography (TTDE). The purpose of this study was to test the hypothesis that detection of a diastolic reverse flow in the distal coronary arteries with wall motion assessment by TTDE may lead noninvasive diagnosis of ischemia.

Methods: We studied 24 patients with diastolic reverse flow; 10 in the LAD (group-L) and 14 in the RCA (group-R). Under the guidance of color Doppler flow mapping, the distal LAD was examined in the anterior interventricular sulcus with a high frequency transducer (5 MHz) and the distal RCA was searched in the posterior interventricular sulcus with a low frequency transducer (2.5 MHz, ACUSON, Sequoia 512). For estimation of coronary shape, exercise 201-TI Single Photon Emission Computed Tomography (SPECT) and coronary angiography (CAG) were performed within 48 hours after TTDE examination.

Results: In all patients, CAG revealed reverse flow through the apex in the LAD (10/10 of group-L) and in the RCA (14/14 of group-R). In 21 of 24 pts, 9 in group-L and 12 in group-R, with normal or hypokinetic wall motion, SPECT showed reversible perfusion defect in the LAD and RCA territories, respectively. In residual 3 of 24 patients with a-dyskinetic wall motion (1 in group-L and 2 in group-R), SPECT showed fixed perfusion defect in the LAD and RCA territories, respectively. Thus, sensitivity and specificity of diastolic reverse flow in the coronary artery for detection of physiologically significant coronary narrowing were 100% and 100%, respectively, in patients without skinles and dyskinesis.

Conclusion: Diastolic reverse coronary flow assessed by TTDE at rest accurately predicts coronary occlusion with physiologically significant myocardial ischemia when resting wall motion is normal or hypokinetic.

1211-54

Great Cardiac Vein Flow Recorded With High Frequency Transesophageal Doppler Technique Can Predict Myocardial Viability in Patients With Anterior Myocardial Infarction

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Background: The great cardiac vein (GCV) anatomically runs parallel just beside the left anterior descending coronary artery, and its flow is the total drainage of the perfusion of the anterior myocardium. The recent technological development in echocardiographical devices made these small vessels flows detectable with a transesophageal Doppler (TTDE) technique. We associated whether GCV flow reflects myocardial viability, that is mainly determined by the amount of residual myocardium, in patients with reperfused anterior wall acute myocardial infarction (AMI) by analyzing their GCV flow patterns recorded with a low frequency transducer (2.5MHz, ACUSON, Sequoia 512).

METHODS: Study population was consisted of 15 patients with first anterior AMI who underwent successful coronary intervention. The GCV flow in the mid-distal portion was recorded sufficiently with TTD (HDI 5000 or SONOS 5500) 7 days after the onset. The systolic phase dominant flow pattern with a PV range of 15.3 to 48.7cm/sec. Statistical analysis revealed no co-relationship between GCV flow and the WMS at day-7, when the coronary flow was recorded. A significant correlation, however, was found between GCV flow and the WMS at day-7 and 21d-WMS (r=-0.65, p=0.0073). Conclusion: This result implicates that GCV flow recorded with TTDE at day-7 is independent of the coronary wall motion at abnormality, but can potentially be an index to estimate the myocardial viability in patients with reperfused anterior AMI.

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Comparison of Proximal Isovelocity Surface Area Method With Pressure Half Time Method For Evaluation of Mitral Valve Area in Patients Undergoing Balloon Mitral Valvuloplasty

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BACKGROUND: Percutaneous valvuloplasty is the treatment of choice in patients with rheumatic mitral stenosis and pliable valve. Pressure half time (PHT) method is unreliable for determination of mitral valve area (MVA) immediately after valvuloplasty. Proximal isovelocity surface area (PISA) method has been used to derive MVA in patients with mitral stenosis. The aim of our study was to compare PISA method with PHT method in patients undergoing percutaneous balloon mitral valvuloplasty (BMV).

METHODS: Mitral valve area was calculated by 2-D planimetry, PHT and PISA methods. Mitral valve area was calculated by PISA method using continuity equation by the formula 2πr²vₚ, where r² is the hemispheric isovelocity area, vₚ is the velocity at the radial distance r from the orifice and V the peak velocity. A plano-angle correction factor (θ/180°) was used to correct the inlet angle subtended by leaflet tunnel as a result of leaflet doming.

RESULTS: Ninety-two patients with optimal transthoracic echo window were included in the study. Satisfactory MVA was obtained by PISA method in 84 patients (91.4%) before BMV and 72 patients (85.7%) after BMV. The mean MVA calculated by PISA was 0.57 ± 0.154 cm² before BMV and 1.78 ± 0.072 cm² after BMV. MVA valve area calculated using the PISA (r = 0.5217, p < 0.0015 SE 0.215) method and PHT (r = 0.6602, p < 0.001 SE 0.071) method correlated well with 2-D method in patients with mitral stenosis before valvuloplasty. After BMV, mitral valve area by PISA method correlated well with 2-D planimetry (r = 0.5003, p<0.0015 SE 0.025) but PHT showed poor correlation (r=0.1334, p=0.199 SE 0.038). CONCLUSION: The PISA method correlates well with 2-D planimetry in patients with mitral stenosis before and after BMV and is superior to PHT method in the post BMV period. This method can be used reliably for assessment of MVA in patients undergoing BMV and who have suboptimal parasternal window.