

### 1211-52 The Effect of Aortic Valve Replacement on Coronary Flow Reserve in Patients With Hemodynamically Significant Aortic Stenosis and Normal Coronary Angiogram

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

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

**Patients and methods:** Sixteen patients (9 women and 7 men; mean age  $66\pm 7$ ) were enrolled into the study. All patients underwent 2 months before and 1 year after the AVR a complete transthoracic 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 dipyridamol (0.56 mg/kg over 4 minutes) as a vasodilator agent. CFR was calculated as the ratio of maximal averaged peak diastolic flow velocities (APV)/based APV. Results are presented in the table.

**Results: Data before and after AVR**

	before AVR	after AVR	p value
LVMI (g/m <sup>2</sup> )	180.8±55.6	128.6±31.4	0.002
CFR	1.94±0.54	2.51±0.79	0.03
Peak AOS gradient (mm Hg)	94±25	25±8	0.001
Effort angina	7/16 (44%)	1/16 (6%)	0.01

**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 Transthoracic Doppler Echocardiography at Rest: Diastolic Reverse Coronary Flow Versus Exercise 201-Tl 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 searched in the anterior interventricular sulcus with a high frequency transducer (5MHz) and the distal RCA was searched in the posterior interventricular sulcus with a low frequency transducer (2.5MHz, ACUSON, Sequoia 512). For estimation of coronary narrowing, exercise 201-Tl 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 apex in the LAD (10/10 of group-L) and in the RCA (14/14 of group-R). In 21 of 24 patients, 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- or dyskinesic 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 akinesis and dyskinesia.

**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 Transthoracic 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 vessel flows detectable with a transthoracic Doppler (TTD) technique. We assessed 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

TTD. **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 peak velocity (PV, cm/sec) and time velocity integral (TVI, cm) were measured from each recorded flow velocity pattern respectively. 2-D echocardiography was performed at days-7 and 21, and the wall motion score of the left ventricle (WMS; the sum of 17 segmental scores (normokinesia=0 to akinesia=3)) was calculated accordingly. WMS at day-21 was utilized as a parameter of myocardial viability. **Results:** The GCV flow showed a systolic phase dominant flow pattern with a PV range of 15.3 to 48.7cm/sec. Statistical analysis revealed no co-relationship between GCV-TVI and the WMS at day-7, when the concerning flow was recorded simultaneously. A significant co-relationship, however, was found between GCV-TVI at day-7 and 21d-WMS ( $r=0.65$ ,  $p=0.0073$ ). **Conclusion:** This result implicates that GCV flow recorded with TTD at day-7 is independent of the wall motion abnormality at that moment, but can potentially be an index to estimate the myocardial viability in patients with reperfused anterior AMI.

### 1211-55

### Clinical and Echocardiographic Spectrum of Mitral Valve and Papillary Muscle Injury as a Complication Related to Percutaneous Transvenous Mitral Commissurotomy With Inoue Balloon Catheter: Experience From 6,800 Patients

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Severe mitral regurgitation (MR) is an infrequent but recognized complication following percutaneous transvenous mitral commissurotomy (PTMC) due to chordal rupture, excessive commissural splitting, tear of mitral valve (MV) leaflets or papillary muscle injury. To examine the mechanism, frequency and natural history, and to assess the clinical course of patients who chose to have medical therapy alone despite severe injury to MV apparatus, we reviewed records of 6800 pts who underwent PTMC during a 9 year period (Inoue technique) to identify those who were detected to have leaflet tear either at surgery or by 2D-echocardiography within 24 hours of the indexed procedure. A total of 32 pts (4.7%) had such complications. Of these, 19 (gr I) underwent MV surgery and 13 (group II) refused to undergo surgery. The 2 groups were similar with regard to age, baseline MV area/score, and frequency and grade of pre-existing MR. Pts in group I had immediate hemodynamic collapse following PTMC, a lesser fall in transmitral mean gradients (6±2 mmHg) as compared to pts in group II who had a significant fall in transmitral gradients (19±5 mmHg) with no hemodynamic collapse. All except one pt in group I had tear of the anterior mitral leaflet. No pt in group I had papillary muscle rupture and one had only posterior leaflet tear. In group II, 9 pts had tear of the anterior leaflet, 2 had tear of the posterior leaflet and the remaining 2 had both leaflet tear. Rupture of the posterior papillary muscle was noted in 6 of these 13 pts. Pts in group II have been followed for 2 to 55 months (mean 27±11 months); 2 of these patients have class II and one has class III symptoms. Of those with papillary muscle rupture, only one is significantly symptomatic. **Conclusion:** Rupture of mitral leaflets and/or posterior papillary muscle as a cause of severe mitral regurgitation occurs in about 5% of pts following PTMC by the Inoue technique. Many such patients appear to tolerate this severe injury to mitral apparatus well for a long time.

### 1211-56

### 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  $2\pi r^2 V_r/V_m$ , where  $2\pi r^2$  is the hemispheric isovelocity area,  $V_r$  is the velocity at the radial distance 'r' from the orifice and  $V_m$  the peak velocity. A plane-angle correction factor ( $\theta/180$ ) 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  $0.87 \pm 0.154$  cm<sup>2</sup> prior to BMV and  $1.78 \pm 0.272$  cm<sup>2</sup> after BMV. Mitral valve area calculated using the PISA ( $r = 0.5217$ ,  $p < 0.0001$  SE 0.016) method and PHT ( $r = 0.6652$ ,  $p < 0.0001$  SE 0.017) method correlated well with 2-D method in patients with mitral stenosis before BMV. After BMV, mitral valve area by PISA method correlated well with 2-D planimetry ( $r = 0.5803$ ,  $p < 0.0001$  SE 0.053) but PHT showed poor correlation ( $r = 0.1334$ ,  $p = 0.199$  SE 0.036).

**CONCLUSION:** The PISA method correlates well with 2-D planimetry in patients with mitral stenosis before and after BMV and is superior to PHT 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.