

lar damage in patients with AMI. We investigated MCE with harmonic power Doppler (HPD), CFR and CF by using transthoracic echocardiography (TTE) in predicting functional recovery. Methods: We performed MCE (SONOS5500, Philips) by using 1:4 intermittent HPD with Levovist at rest and during ATP in 30 patients two weeks after anterior AMI. Peak videointensity was measured within the risk and control regions. The peak intensity ratios of the risk area to the control area (PIR) at rest and during hyperemia were calculated. We measured CFR of the left anterior descending artery (LAD) two weeks after AMI. CF of LAD by TTE was also obtained within 24 hours after successfully recanalization, and DDT of LAD was measured. Left ventricular (LV) end-diastolic volume (EDV) and LV ejection fraction (EF) by angiography were assessed in the acute phase and 6 months after AMI. Results: Pts were divided into 2 groups based on the severity of microvascular damage. CFR correlated with DDT ($r=0.724$, $p<0.006$). Conclusions: MCE, CFR and CF are useful for predicting functional recovery following AMI.

	Group A (DDT:600msec) (n=20)	Group B (DDT:600msec) (n=10)
PIR at rest	0.668±0.178	0.248±0.015#
PIR during hyperemia	0.725±0.194	0.295±0.107#
EDV in the acute phase (ml)	112±33	146±38
EDV at follow-up (ml)	114±30	192±39*
EF in the acute phase (%)	50±7	45±9
EF at follow-up (%)	52±7	39±9*
CFR	2.60±0.8	1.31±0.29*
	#p<0.05	*p<0.01

1043-48

Feasibility, Symptoms, Adverse Effects and Complications Associated With Noninvasive Assessment of Coronary Flow Velocity Reserve During Intravenous Adenosine Infusion: Experience in 1,222 Patients

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Background: Noninvasive assessment of coronary flow velocity reserve (CFVR) with contrast-enhanced transthoracic echocardiography (CE-TTE) is an increasingly used method to evaluate the effects of epicardial coronary stenosis and coronary microvasculature function. The purpose of this investigation was to analyze and review the Cagliari University experience in assessing CFVR with CE-TTE to define the feasibility, safety, adverse event profile, and complications rate of the test.

Methods: We evaluated CFVR in the left anterior descending coronary artery (LAD) with CE-TTE during adenosine infusion. The pulsed wave Doppler of blood flow velocity was recorded in the LAD at rest and after maximum vasodilation by adenosine infusion (140 mcg/kg/min in 5 minutes). We analyzed 1222 consecutive CFVR CE-TTE studies starting January 2000 to July 2002. The patients (372 female and 850 males; age: 62±11.6 years) were referred for CFVR studies for different reasons: 871 pts for follow up after elective and primary PTCA on LAD, 267 pts for angina, 25 pts for hypertrophic cardiomyopathy, 22 pts for hypercholesterolemia, 6 pts for systemic sclerosis, 47 pts for others reasons.

Results: A complete CFVR study was achieved in 1200 pts (feasibility: 98.2%), also performed in the early phase of acute coronary syndrome. In the remaining 22 pts (1.8%) the study was interrupted because of failure to visualize LAD (7), hyperpnea (7), chest pain without EKG changes (4), nausea and headache (3), chest pain with ischemic EKG (1).

Minor symptoms or adverse effects occurred in 521 pts (43%) not requiring test termination: hyperpnea (15%), flushing (9%), chest pain without EKG changes (7%), headache (8%), minor arrhythmias (3.6%), chest pain with EKG changes (1%). No major complications were observed during all studies.

Conclusion: Noninvasive assessment of CFVR in LAD by CE-TTE is a very feasible method with very low incidence of adverse events and complications. It can be used and safely performed in the evaluation of atherosclerotic LAD disease and in a broad spectrum of cardiac disease with microvascular impairment.

1043-49

Measurement of Renal Blood Flow Using Contrast-Enhanced Ultrasound in Patients With Renal Artery Stenosis

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Background: Microbubbles behave like RBC in microvasculature, therefore we can measure myocardial blood flow by measuring velocity of microbubbles using ultrasound. We hypothesized that abnormal renal blood flow from renal artery stenosis can be measured using contrast-enhanced ultrasound (CEU).

Method: Renal blood flow was measured using CEU in 16 patients (8 males, 49±21 years) with unilateral renal artery stenosis, at rest and during intravenous infusion of dopamine (2.5 µg·kg⁻¹·min⁻¹). In both kidneys, refilling rate (β) of microbubbles after high-power destruction was assessed using low mechanical-index Power Pulse Inversion (HDI 5000, ATL) during continuous infusion of microbubbles. In 6 patients, DTPA-renogram was performed for comparison.

Result: Microbubble velocity (β) in diseased kidney was significantly lower than the

velocity in control kidney (0.46±0.24 vs 0.91±0.49, $p=0.001$). During increased renal blood flow with dopamine, significant difference in β was also observed between diseased and control kidney (0.78±0.26 vs 1.08±0.36, $p<0.05$). In 5 patients with abnormal DTPA-renogram, CEU showed marked reduction of β in diseased kidney (28-66% of control kidney).

Conclusion: Abnormal renal blood flow can be measured using CEU in patients with renal artery stenosis. CEU may be useful in screening of renal artery stenosis.

1043-50

Nicorandil Preserves Collateral Circulation Even at Reduced Systemic Pressure in Comparison With Nitroglycerin: Real-Time Myocardial Contrast Echocardiographic Study

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Background: Collateral circulation of microvessel level is important for salvage of the myocardium at risk by coronary obstruction. Real-time myocardial contrast echocardiography (MCE) is useful to evaluate myocardial perfusion quantitatively. However, it has not been elucidated the effect of therapeutic agents on micro-collateral circulation, especially at systemic hypotension.

Purpose: The purpose was to evaluate the effect of nitroglycerin and nicorandil on micro-collateral circulation at systemic hypotension by using real-time MCE.

Methods: Real-time MCE of the left ventricular short axis view was examined by Sequoia 512 (SIEMENS) during infusion of Optisor® in 15 dogs. After the left circumflex artery was completely occluded followed by bubble destruction using high acoustic power, video intensity (VI) of the risk area during 30 seconds of occlusion was examined. Presence of collateral flow was determined by opacification de novo during coronary occlusion. The final subjects as having good collateral flow were 8 dogs in which VI at ischemic area was above 15% of VI at non-ischemic area. The VI plot of the ischemic area was fitted to the exponential function $y=A(1-e^{-\beta t})$. The value of $A \times \beta$ (MCE-derived MBF) and percent wall thickening (%WT) of the ischemic area were calculated, and the flow volume of left anterior descending coronary artery (LAD) and mean systemic blood pressure (mBP) were measured. Dosage of nitroglycerin and nicorandil was determined to make mBP reduce equivalently.

Results: Significant hypotension was induced by each drug (nitroglycerin: 75 ± 16 to 41 ± 8 mmHg, nicorandil: 72 ± 13 to 47 ± 7 mmHg). Nitroglycerin decreased $A \times \beta$ value at ischemic area significantly (5.6 ± 2.6 to 2.7 ± 1.3, $p<0.05$), concomitant with reduction of %WT. Nicorandil, on the other hand, did not change MCE-derived MBF or %WT at ischemic area in spite of systemic hypotension. LAD flow increased from 6.1 ± 2.3 to 8.8 ± 2.1 ml/min during nicorandil at hypotension, while it did not change during nitroglycerin. **Conclusion:** Nicorandil can preserve coronary flow volume through micro-collateral circulation even at the systemic hypotension induced by its vasodilating effect, while nitroglycerin cannot.

POSTER SESSION

1044 New Echocardiographic Approaches to the Evaluation of Cardiomyopathy

Sunday, March 30, 2003, Noon-2:00 p.m.

McCormick Place, Hall A

Presentation Hour: 1:00 p.m.-2:00 p.m.

1044-35

Relationship Between Doppler-Derived Left Ventricular Filling Parameters and Exercise Capacity in Patients With Hypertrophic Cardiomyopathy

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BACKGROUND: Impaired left ventricular (LV) diastolic function is a prominent feature of hypertrophic cardiomyopathy (HCM). Conventional Doppler indices of LV diastolic function, however, do not correlate with filling pressures in patients with HCM. Diastolic mitral annular velocity (E') measured using Doppler tissue imaging (DTI) has been reported to be a preload independent index of myocardial relaxation and LV filling pressures can be estimated in HCM by combining mitral inflow (E) and E'. The purpose of this study was to determine the relationship between E' combined with conventional Doppler indices and exercise capacity in HCM.

METHODS: Fifteen patients with HCM (8 male, mean age, 52 ± 14, 13 nonobstructive) underwent supine bicycle exercise (Ex) and two-dimensional and Doppler echocardiographic study at the same time. The mitral inflow velocities were traced and the following variables were derived: peak velocity of early (E) and late (A) filling and deceleration time (DT) of E velocity. E' was measured at septal corner of mitral annulus by DTI from apical 4-chamber view. **RESULTS:** E/E' correlated inversely with Ex duration ($r = -0.55$, $p < 0.05$). There was significant positive correlation between E' and Ex duration ($r = 0.60$, $p < 0.05$). However, no correlation was found between conventional Doppler indices and Ex