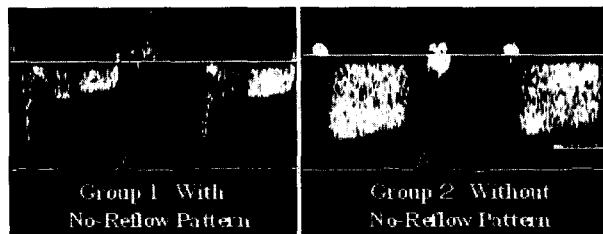


groups. However, the DcT of PICA was significantly lower in group 1 (160 ± 70 vs. 970 ± 327 msec; $p < 0.001$). The incidence of cardiovascular symptoms (chest pain or syncope) was significantly higher in group 1 (68 vs. 30%; $p < 0.05$). Although both groups did not have stenosis in coronary angiogram, ischemic regions in thallium-201 SPECT were more often in group 1 (75 vs. 20%; $p < 0.05$).

Conclusions: Patients with HCM, no-reflow pattern in the PICA was associated with higher incidences of clinical symptoms, and regional myocardial ischemia, suggesting impaired microcirculation in the absence of epicardial coronary disease.



11:30 a.m.

843-5

Conduit Arterial Stiffness Is Associated With Impaired Left Ventricular Subendocardial Function

Dragos Vinereanu, Eleftherios Nicolaidis, Lucy Boden, Nicola Payne, Christopher H. Jones, Alan G. Fraser, University of Wales College of Medicine, Cardiff, United Kingdom

Subendocardial function of the left ventricle (LV), governed by the longitudinal myocardial fibres, is more likely to be affected by microvascular ischaemia, caused by structural changes that reduce myocardial perfusion, and by functional changes, such as increased conduit arterial stiffness. We used a new non-invasive method of assessing arterial function, to test the hypothesis that subendocardial dysfunction is related to arterial stiffness.

Methods: We studied 83 subjects (54 ± 12 years, 59 men). Stiffness parameter β was calculated as: $\beta = \ln(Ps/Pd)/[(Ds/Dd)-1]$, where Ps and Pd are systolic and diastolic blood pressure in the brachial artery, and Ds and Dd are the maximal and minimal diameters of the right common carotid artery measured by wall tracking (Aloka SSD-5500). LV was assessed by transthoracic echo including tissue Doppler studies. LV mass index was calculated by method of Devereux. Global systolic function was assessed by ejection fraction (EF), global diastolic function by flow propagation velocity (FPV) and mitral E/annular Ea ratio; and regional function by systolic and diastolic myocardial velocities (mean velocities of 4 basal segments in the apical views for longitudinal function, and basal posterior wall in the parasternal view for the radial function).

Results: By univariate analysis, β was inversely related to LV longitudinal function ($r = -0.47$ for systolic velocity, $r = -0.58$ for early diastolic velocity, both $p < 0.0001$), but it was not related to radial systolic velocity ($r = -0.03$) or to global EF ($r = -0.19$). There was a moderate correlation with global diastolic function ($r = -0.55$ with FPV; and $r = 0.47$ with E/Ea; both $p < 0.0001$). By stepwise multiple regression analysis, longitudinal LV systolic velocity was inversely related to β index and LV mass index ($r = 0.54$, $r^2 = 0.29$, $p < 0.0001$); longitudinal early diastolic velocity was inversely related to age and β index ($r = 0.69$, $r^2 = 0.47$, $p < 0.0001$).

Conclusion: LV subendocardial function is inversely related to conduit arterial stiffness, suggesting that non-invasive assessment of the β index will be useful for studying the effects on arterial stiffness of treatment designed to optimise ventriculo-arterial coupling.

11:45 a.m.

843-6

Strain Rate Analysis Allows Detection of Differences in Diastolic Function Between Viable and Nonviable Myocardial Segments

Rainer Hoffmann, Ertunc Altioek, Bernd Nowak, Harald Kuhl, Udalrich Bull, Peter Hanrath, University Aachen, Aachen, Germany

Background: Diastolic function analysis was suggested to detect myocardial ischemia. Analysis of diastolic function to assess myocardial viability has not been done. Strain rate (SR) analysis allows quantitative segmental analysis of myocardial function and has been used during dobutamine echocardiography (DSE) for assessment of myocardial viability.

Methods: In 37 patients with ischemic left ventricular dysfunction myocardial viability was assessed using low dose ($10 \mu\text{g/kg/min}$) 2D DSE, SR imaging and F18-fluorodeoxyglucose positron emission tomography (PET). Peak early diastolic (E-wave) and late diastolic (A-wave) myocardial SR was determined at baseline and during dobutamine stimulation from apical views.

Results: 192 segments with dyssynergy at rest were classified by ^{18}F FDG PET as viable in 94 cases and non-viable in 98 cases. There were no differences in peak E-wave and A-wave SR at rest between viable and non-viable segments. With dobutamine stimulation peak E-wave SR increased for viable while it was unchanged for non-viable segments. Peak A-wave SR increased for viable and non-viable segments. However, during dobutamine stimulation peak E-wave and A-wave SR were larger for viable than for non-viable segments.

Conclusions: Viable segments demonstrate increase in early and late diastolic SR with dobutamine stimulation while non-viable segments are less responsive. Diastolic SR analysis during dobutamine stimulation may add to systolic function analysis in the assessment of viability.

Diastolic strain rate related to myocardial viability by PET

	Viable by PET (n=94)	Non-viable by PET (n=98)	P
Peak E-wave SR at rest (1/s)	0.89 ± 0.51	0.77 ± 0.49	0.103
Peak E-wave SR with dobutamine (1/s)	$1.06 \pm 0.51^*$	$0.78 \pm 0.48\#$	<0.001
Peak A-wave SR at rest (1/s)	0.71 ± 0.55	0.57 ± 0.47	0.055
Peak A-wave SR with dobutamine (1/s)	$1.00 \pm 0.56^*$	$0.71 \pm 0.58\#$	<0.001

* $p < 0.01$ vs rest # $p = 0.835$ vs rest
§ $p = 0.023$ vs rest

POSTER SESSION

1188 Alterations of Left Ventricular Geometry: Echocardiographic Insights

Tuesday, April 01, 2003, Noon-2:00 p.m.

McCormick Place, Hall A

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

1188-31

The Tako-Tsubo Syndrome (Transient Apical Ballooning): A United States Perspective

Paula Seth, Gerard P. Aurigemma, Joshua Krasnow, Andrea M. Sweeney-Walsh, Jeffrey C. Hill, Dennis A. Tighe, Theo E. Meyer, University of Massachusetts Medical School, Worcester, MA

Background: The Tako-tsubo syndrome, characterized by acute chest pain accompanied by reversible apical ballooning in the absence of coronary artery disease, is well described in the Japanese literature. This syndrome, however, has not been extensively recognized *per se* in the US. **Methods:** Since initial recognition of this syndrome in our institution (376 bed tertiary care referral hospital) in 7/01, we have prospectively collected clinical and echo data in 12 pts (11 women, mean age 64 ± 14 years) presenting with chest pain or shortness of breath plus electrocardiographic and enzymatic data consistent with acute myocardial infarction. In all pts, follow-up echo was obtained within 2 weeks. **Results:** An identifiable precipitating ("trigger") event could be identified in all 12 individuals, and was related to one or more of: respiratory failure (7), relative's death (3), peri-procedural (2), panic disorder (1). All pts had marked precordial T-wave inversion, suggesting acute myocardial ischemia, and reminiscent of "cerebral" T waves. Consistent with Japanese reports, mean QTc was 578 ± 96 msec and there was evidence of mild myocardial necrosis: mean CK 152 ± 32 U/L (MB% 5.5 ± 5.1), and troponin I 0.99 ± 0.66 ng/dl.

Echocardiography showed a characteristic wall motion pattern, with significant apical dysfunction and preserved basal function, with similar findings at ventriculography. The RV apex was generally spared. Of the 10 patients that underwent coronary arteriography, none had significant stenoses. Follow-up echo showed normalization in the regions of the LV that was abnormal, in as little as 2 days. **Conclusion:** A syndrome of chest pain, dyspnea, ECG and enzyme changes mimicking acute myocardial infarction, identical to the Japanese "Tako-tsubo" syndrome is not uncommonly encountered among US patients; all episodes appear to have an identifiable trigger. There is a striking female preponderance, for unclear reasons. With the ready availability of echo, it is likely that enhanced awareness of this syndrome, particularly among (respiratory) ICU physicians, will result in its more frequent diagnosis and the elucidation of the mechanism(s) involved.

1188-32

The Effects of Harmonic Imaging on Endocardial Visualization During Transesophageal Echocardiography

R. Parker Ward, David G. Miller, Keith A. Collins, Jeanne M. DeCara, Kirk T. Spencer, Victor Mor-Avi, Roberto M. Lang, University of Chicago, Chicago, IL, Philips Imaging Systems, Andover, MA

Although harmonic imaging (HI) improves endocardial visualization and is necessary for myocardial perfusion imaging, it has yet to be implemented in TEE. Our goal was to determine whether HI implemented in a prototype TEE probe (Phillips) improves endocardial visualization and allows perfusion imaging. **Methods:** In 23 patients, fundamental and harmonic images were obtained in the transgastric short axis (TSAX) and mid-esophageal 4-chamber (4C) views, and reviewed for endocardial visualization (score: 0-none, 1-partial, 2-complete) by 3 blinded readers. In 14 additional patients, perfusion imaging (flash echo) was performed in the TSAX during contrast infusion (Definity). Regional perfusion was confirmed by: 1) visualization of adequate contrast refilling by 2 readers, 2) quantitative fitting to a standard contrast replenishment model (QLab, Philips). **Results:** HI improved overall endocardial visualization, most noticeably in the anterior and lateral segments ($p < 0.004$) in the TSAX, and in the lateral segments ($p < 0.01$) in the 4C (figure). The salvage rate (score increase from 0 to 1 or 2) was 8.3% in the TSAX and 12.6% in the 4C. Myocardial perfusion was consistently confirmed in the inferior (86%), posterior (100%), and lateral (79%) segments, but rarely in the septal