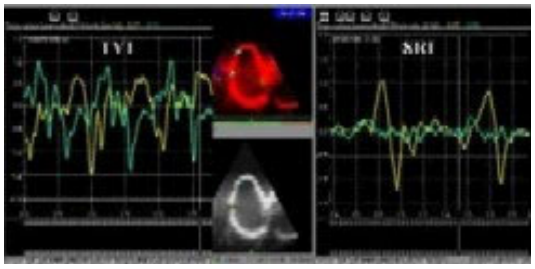
when the balloons were mechanically contracted. They were inflated to 7 different volumes (30-115 cc) over which the aneurysm area was measured. The wall thickness varied gradually from 5-6 mm towards the thin (0.5 mm) aneurysm segment. Scanning was performed using a 5MHz multiplane transesophageal probe (GE/VingMed System FiVe). Long-axis images taken from two orthogonal views were transferred to an analysis program (EchoPac 6.3.6). Cine loops at 30^{o} rotational steps over three cycles were analyzed for tissue Doppler (TDI) and strain rate (SRI). Separability was tested using peak values derived from TDI and SRI, compared as a ratio of apex aneurysm to normal segment values.
Results: The mean ratio for TDI aneurysm/normal segment biplane area was 0.79 ± 0.15(SD) and for SRI, 0.36 ± 0.09, p<0.05, with better separation. Moreover, using "time variable" area determined over arcs for the rotational planes with SRI which showed cleaner transitions and less effect of tethering, yielded a closer agreement with measured aneurysm area for the balloons and the filling volumes (r = 0.71 for TDI and r = 0.93 for SRI reconstructions).
Conclusions: SRI was more sensitive than TDI for assessing LV aneurysm in our model.



1016-156 **Color M-Mode Doppler Flow Propagation Velocity Is a New Echocardiographic Method for Quantification of Mitral Regurgitation**

Laurent Colas, Bouchra Colas, Perla Raharitsoa, Hamza Mohsinaly, Van Huong Chuong, Christian Kichenin, Felix Guyon Hospital, Saint - Denis, Reunion

Background: The color M-mode Doppler flow propagation velocity (Vp) has been reported as a preload-independent measure of left ventricular diastolic function and as a method for the assessment of the severity of aortic regurgitation. The aim of this study was to assess the use of color M-mode Doppler Vp to determine the severity of mitral regurgitation (MR) and to compare its reliability with angiography and other echocardiographic methods.
Methods: We prospectively studied 45 patients (62 ± 13 years, 22 male and 23 female) who had cardiac catheterization for various reasons. For each patient, we recorded the angiographic grade of MR and measured thereafter, by transthoracic echocardiography, Vp with color M-mode Doppler in the apical 4-chamber view (M-mode cursor parallel to MR color Doppler flow) and other echocardiographic parameters : regurgitant flow rate (Q), regurgitant orifice surface (SOR) and regurgitant volume per beat (VR) by the proximal isovelocity surface area method, right upper pulmonary venous flow morphology and ratio of time-velocity integral mitral/aortic.
Results: 15 patients had an angiographic grade 1 MR, 15 patients grade 2, 8 patients grade 3 and 7 patients grade 4. No statistical differences were seen in age, gender, angiographic ejection fraction or left ventricular end-diastolic pressure among the four groups. The mean values of Vp were respectively 36.5 ± 10.4 cm/s, 54.6 ± 6.7 cm/s, 77.4 ± 4.2 cm/s, 83 ± 5.4 cm/s (p<0.0001). A high significant correlation was found between angiographic grades of MR and Vp (r = 0.91, p< 0.0001), Q (r = 0.96, p< 0.0001), SOR (r = 0.91, p< 0.0001), VR (r = 0.95, p< 0.0001), pulmonary venous flow morphology (r = 0.87, p< 0.0001) and ratio of time-velocity integral (r = 0.74, p< 0.0001). Furthermore, significant correlation was observed between Vp and proximal isovelocity surface area method parameters : r = 0.9, p< 0.0001 with Q, r = 0.85, p< 0.0001 with SOR and r = 0.9, p< 0.0001 with VR.
Conclusion: The color M-mode Doppler Vp is an easy, fast and reliable parameter for the quantification of MR.

Noninvasive Imaging

POSTER SESSION

1017 Contrast Echocardiography: Novel Uses

Sunday, March 07, 2004, 9:00 a.m.-11:00 a.m.
Morial Convention Center, Hall G
Presentation Hour: 10:00 a.m.-11:00 a.m.

1017-157 **Measurements of Contrast Intensity in Systole Are More Accurate Predictors of Myocardial Blood Flow: Validated by Microspheres**

Xuedong Shen, Feng Xie, David Cloutier, John Lof, Thomas R. Porter, Leng Jiang, The Cardiac Center of Creighton University, Omaha, NE

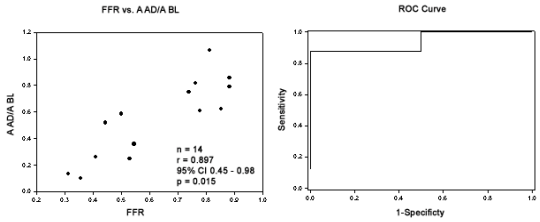
Background: Previous studies have demonstrated cyclic variation of myocardial signal intensity with a higher systolic value. **Methods:** To further evaluate the predictive value of systolic and diastolic measurements of myocardial blood flow (MBF) on real-time myocardial flow imaging, nine open chest dogs were studied by myocardial contrast echocardiography with power pulse imaging (PPI) and by Neutron Activated Microspheres (MIC). Perfluorocarbon microbubbles were administered as a constant infusion. The images were obtained from left ventricular short axis view at papillary muscle level. The regions of interest were placed on the endocardium (END) and epicardium (EPI) of the anterior wall. PPI derived MBF (PPI_{MBF}) was calculated by the product of the rate of replenishment and the plateau of myocardial acoustic density, which was corrected by the corresponding acoustic intensity in the central point of left ventricular cavity. Three sets of PPI_{MBF} were obtained during systole, diastole and whole cardiac cycle, and compared with MIC derived MBFs (MIC_{MBF}). **Results:** MIC_{MBF} was 1.23±0.71 ml/min/g at END and 0.91±0.51 ml/min/g at EPI. The PPI_{MBF} in systole was greater than that in diastole and was the most correlated with MIC_{MBF} (Table).
Conclusions: There is consistent cyclic variation of myocardial signal intensity on real-time myocardial perfusion imaging. Systolic measurements are more accurate predictors of myocardial blood flow measured by Microspheres.

	R			SEE			P		
	Systole	Diastole	Whole	Systole	Diastole	Whole	Systole	Diastole	Whole
END	0.87	0.79	0.81	0.38	0.47	0.45	0.002	0.012	0.009
EPI	0.85	0.81	0.82	0.29	0.32	0.31	0.004	0.009	0.007

1017-158 **Myocardial Contrast Echocardiography Provides a Noninvasive Estimation of Fractional Flow Reserve**

Amr E. Abbas, Carlos A. Moreno, Steven J. Lester, Mayo Clinic Scottsdale, Scottsdale, AZ

Background: The ratio of maximal hyperemic coronary flow in the presence of an epicardial stenosis to normal maximum hyperemic flow, fractional flow reserve (FFR), is an invasive index useful to determine the severity of coronary stenosis. Myocardial contrast echocardiography (MCE) can evaluate parameters of myocardial flow and blood volume (MBV). We hypothesized that FFR could be assessed non-invasively by using MCE
Methods: In an open chest dog model a specially designed metal occluder was applied to the proximal LAD and varying degrees of epicardial stenosis were created. Fourteen experiments were performed. A high fidelity micromanometer catheter was placed in the ascending aorta for measurement of MAP and pressure distal to the created stenosis (Pd) was measured by placing a distal pressure catheter. The invasive measure of FFR was calculated by dividing Pd/MAP during adenosine infusion at each degree of stenosis. MCE was performed using ultraharmonic imaging during a constant intravenous infusion of Definity at baseline and during hyperemia. Myocardial video intensity signal plateau (_) is a measure of MBV. Therefore, the ratio of _ during adenosine ($_{AD}$) infusion to _ at baseline ($_{BL}$) was correlated to FFR.
Results: The ratio $_{AD}/_{BL}$ correlated well with FFR (n = 14, r = 0.897, 95% CI 0.45 - 0.98, p = 0.015). Using ROC curves, a ratio of 0.65 had a 87.5% sensitivity and a 66.7% specificity to determine FFR < 0.75.
Conclusion: MCE can provide a noninvasive estimate of FFR.



1017-159 **Myocardial Contrast Echocardiography Can Detect Changes in Myocardial Blood Volume During Acute Changes in Blood Pressure**

Amr E. Abbas, Carlos A. Moreno, Steven J. Lester, Mayo Clinic Scottsdale, Scottsdale, AZ

Background: Autoregulation (AR) occurs through changes in arteriolar resistance in order to maintain myocardial blood supply under varying perfusion pressures. During hyperemia induced by adenosine, arteriolar resistance is markedly reduced and AR is absent. Myocardial blood volume (MBV) has been studied using myocardial contrast echocardiography (MCE). We hypothesized that MBV changes during acute rises in blood pressure, with and without intact AR, could be evaluated using MCE.
Methods: MCE was performed on 9 open-chest dogs using ultraharmonic imaging during a constant intravenous infusion of Definity. A high fidelity micromanometer was placed in the aorta for measurement of mean aortic pressure (MAP). Methoxamine was infused to achieve variable degrees of BP (baseline, 110, 130, and 150 mmHg) at basal flow (intact AR), and during adenosine infusion (absent AR). Images were obtained at every step and analyzed to determine myocardial video intensity signal plateau, which represents MBV.
Results: With intact AR, MBV significantly decreases starting at a MAP of 130 mmHg. However, with absent AR, significant decline in MBV from baseline occurred at MAP of 150 mmHg.
Conclusion: MBV is influenced by BP. Since capillary blood constitutes the majority of MBV, the decline in MBV may be explained by capillary derecruitment. With intact AR,