

1065-45

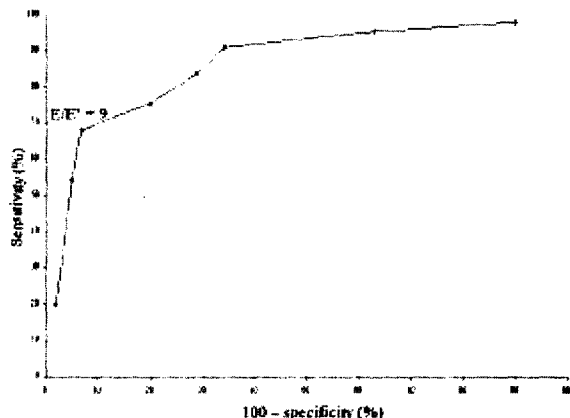
Accuracy of Tissue Doppler Imaging for Predicting Left Ventricular Filling Pressure in Patients With Coronary Artery Disease

Nicolas Mansencal, Erik Bouvier, Thierry Joseph, Rémi Pilière, Michel Rigaud, Pascal Lacombe, Guillaume Jondeau, Olivier Dubourg, Hôpital Ambroise Paré, Boulogne, France

Background: Tissue Doppler Imaging (TDI) has been proposed to assess left ventricular (LV) filling pressure. The aim of this prospective study was to investigate reliability of this method in CAD-patients in clinical practice.

Methods: We studied 32 consecutive CAD-patients, mean age 64 ± 12 years, in sinus rhythm. Twenty-one patients had previous or acute myocardial infarction (MI). All patients underwent cardiac catheterization and echocardiography in the same hour. Cardiac catheterization investigated LV ejection fraction (LVEF) and pre-A-wave pressure. The following echocardiographic parameters were assessed: 1) PW Doppler signals from the mitral inflow (E), 2) PW TDI of the mitral annulus (E'), thus allowing to obtain the mitral inflow to annulus ratio (E/E'), 3) LVEF using wall motion score indexes.

Results: The correlation between invasive and echo was strong ($r = 0.91$). The correlation between pre-A-wave pressure and E/E' was significant ($r = 0.60$, $p < 0.01$). In patients with LVEF $> 50\%$ ($n = 20$), no correlation was found ($r = 0.18$, $p = 0.44$), even when in patients with LVEF $< 50\%$ ($n = 12$), the correlation between pre-A-wave pressure and E/E' was very good ($r = 0.76$, $p < 0.01$). In patients with MI, the correlation between pre-A-wave pressure and E/E' was significant whatever the localization of MI ($r = 0.71$ in anterior MI and $r = 0.8$ in inferior MI). In patients with anterior MI, no correlation was found when LVEF $> 50\%$ ($r = 0.1$, $p = 0.8$) and a strong correlation between pre-A-wave pressure and E/E' was found when LVEF $< 50\%$ ($r = 0.84$, $p = 0.02$). By ROC curve analysis, we identified an E/E' > 9 to be the best cut-off value to fit with a pre-A-wave pressure > 15 mmHg. **Conclusion:** In CAD-patients, TDI is an accurate echo method for predicting left ventricular filling pressure when LVEF $< 50\%$ and may be also used in patients with myocardial infarction.



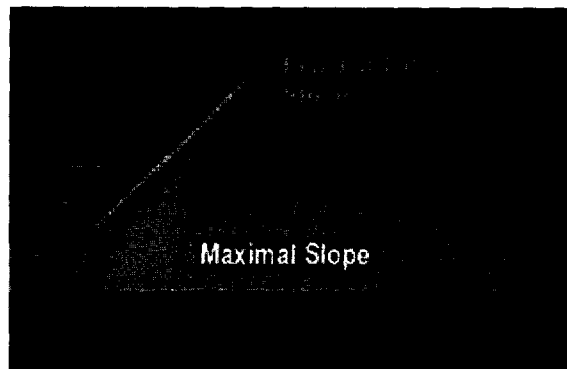
1065-46

In Vitro Study of Flow Propagation Velocity as It Relates to Stroke Volume and Heart Rate

Donald Stevens, Mark Trinh, Ikuro Hashimoto, Aarti Hejmadi, Xiaokui Li, David J. Sahn, Oregon Health & Science University, Portland, OR

Background: Flow propagation velocity (FPV) is used to diagnose diastolic dysfunction. Our purpose was to study the relationship between stroke volume (SV), heart rate (HR) and FPV using a contrast agent bubble slope for the determination of FPV. **Methods:** To model LV function we attached variable stiffness latex balloons to a closed circuit pump. Using a Vivid Five (GE VingMed) scanner and a 5 MHz transducer, we generated M-mode images parallel to the inflow of water, varying SV and HR. We injected microscopic air bubbles into the balloon via a catheter to act as a contrast agent. Images were analyzed for FPV along two slopes, designated "leading inflow slope", which corresponded to first aliasing slope of color M-mode traces, and "maximal slope". We graphed the bubble tracks against SV and HR to determine correlation. **Results:** Neither the leading inflow slope nor the maximal slope showed significant correlation to HR ($r^2 = 0.02$, $r^2 = 0.00$, respectively). Leading inflow slope showed a slightly greater correlation to SV ($r^2 =$

0.72) than maximal slope ($r^2 = 0.69$). **Conclusions:** FPV correlates well with SV, and is not affected by HR. These results validate the use of FPV as a diagnostic tool.



1065-47

Atrial Wave Propagation Determining by Color M-Mode Doppler in Assessment of Diastolic Dysfunction

Alexandros P. Patrianakos, Frangiskos I. Parthenakis, Evangelos A. Papadimitriou, George F. Diakakis, Panagiotis G. Tzerakis, Panos E. Vardas, Heraklion University Hospital, Heraklion, Crete, Greece

Background: Early transmitral velocity propagation (Ep) determining with Color M-Mode Doppler throughout the left ventricle (LV) has been proposed as a useful non-invasive index for assessing LV relaxation. However, there is no data concerning the importance of late transmitral velocity propagation (Ap).

Methods: We investigated 100 patients aged 58.5 ± 10 years who attended our laboratory with echocardiographic evidence of LV diastolic dysfunction. Fifty pts had delayed relaxation (Group I) and 50 pts pseudonormal filling pattern (Group II). Forty age-matched, healthy persons served the control group (control).

An echocardiography study and colour M-Mode Doppler from the apical 4-chamber view in LV inflow, was performed and delayed relaxation pattern was defined if early (E) to late mitral filling wave (A) was < 1 , isovolumetric relaxation time (IVRT) was > 100 msec, deceleration time of E (DTE) was > 220 msec and atrial component (AR) of the pulmonary vein flow was < 35 cm/sec. Pseudonormal pattern was recognized if $E/A = 1-2$, $DTE = 150-200$ msec, $IVRT = 60-100$ msec and $AR > 35$ cm/sec.

Results: Patients with diastolic dysfunction showed significant increased Left atrial dimensions, AR and Ap and significant reduced EF, Ep and Ep/Ar ratio compared to the control group. Group II patients displayed significant increased left atrial dimensions ($p < 0.001$), AR ($p < 0.001$) and Ep/Ar ratio (0.48 ± 0.35 vs 0.35 ± 0.08 , $p < 0.001$) and significant reduced Ap (0.79 ± 0.13 vs 1.02 ± 0.18 , $p < 0.001$) compared to Group I patients. Multivariate logistic regression analysis showed that the strongest independent variable distinguishing normal from pseudonormal filling pattern was the Ep/Ar ratio.

Conclusions: Estimation of the late filling wave propagation through the LV with color M-mode Doppler is a useful index in the study of diastolic function. Measurement of Ep and Ap slopes and their ratio may help in the evaluation of diastolic dysfunction, especially in pts with pseudonormal filling pattern where separation from normal is problematic in the clinical setting.

1065-48

Effects of Regression of Left Ventricular Hypertrophy on Diastolic Function: An Echocardiographic Study

Anna Vittoria Mattioli, Lorenzo Bonetti, Leonardo Fontanesi, Mauro Zennaro, Silvia Bonatti, Giorgio Mattioli, University of Modena and R.E., Modena, Italy

Objectives: The aim of the study was to evaluate the effect of regression of left ventricular (LV) hypertrophy on diastolic function in patients (pts) treated with telmisartan monotherapy for 1 year.

Methods: We performed an echocardiographic follow-up study in 90 pts with mild-moderate LV hypertrophy. Pts population included 67 men and 23 women, mean age 53 ± 10 years. All pts were treated with telmisartan monotherapy for 1 year. Serial echo was performed at 1-3-6-9 and 12 months, so that changes in LVMI and LV function could be related to changes in blood pressure. LV diastolic function was assessed by Doppler echocardiography from mitral flow: peak A velocity (MA) and integral, peak E velocity, deceleration time and isovolumic relaxation time (IVRT), and from pulmonary venous (PV) flow: systolic, diastolic and reversal A wave (PA).

Results: All pts had an increased LVMI. At baseline diastolic function was impaired in all pts. At follow-up we reported a reduction of blood pressure in all pts. The LVMI was reduced after 1 year of treatment (-9.7% , $p < 0.01$). The regression of LV hypertrophy was associated with a reduction in the PA dur/MA dur ratio (from 1.20 to 0.87), while we did not report a variation in the systolic-to-diastolic ratio of PV flow (from 1.15 to 1.18; $p = ns$). At the end of follow-up, we reported that the regression of LV hypertrophy was associated with an increased E/A ratio (from 0.59 ± 0.2 to 0.88 ± 0.2 ; $p < 0.01$), shortened IVRT (from 110 ± 14 to 105 ± 13 , $p < 0.01$), decreased deceleration time (from 230 ± 34 to 214 ± 21 ms; $p < 0.01$). Univariate analysis showed that shortened IVRT was related to a reduction in the LV mass and left atrial maximal and minimal volumes. In the multivariate analysis the reduction in LV mass, the reduction in left atrial maximal and minimal volumes were independently associated with IVRT reduction. A group of 45 pts PV flow showed a normalized pattern earlier compared to Mitral Flow. These pts should have a higher left atrial pressure that decreased with the reduction of LV hypertrophy.