INFLUENCE OF SUBENDOCARDIAL ISCHEMIA ON TRANSMURAL MYOCARDIAL FUNCTION.


Previous studies utilizing intramyocardial ultrasonic crystals under conditions of low flow ischemia characteristic of "hibernating" myocardium, have suggested an uncoupling of the relationship between flow and function. To better evaluate this relationship we employed a non-traumatic epicardial (single crystal) pulse doppler technique, which allows complete transmural assessment of myocardial thickening. Low flow ischemia was produced in 6 open-chested dogs by partial LAD occlusion, adjusted to maintain the distal LAD pressure at 44±3% of baseline for 3 hrs. Serial measurements of thickening fraction (TF) in ischsemic (IS) and nonischsemic (NI) regions were obtained at baseline and after LAD occlusion. In order to study the relationship between TF and flow, we also monitored endocardial surface flow (EF). The transmural flow gradient under the crystal was assessed by radio-labeled microspheres injected at baseline, and during low flow at 30 min (LF1) and 180 min (LF2). Minimal endocardial (EN) necrosis was evident by TTC staining in 3 dogs. Pulsed doppler (PDI) and TF were calculated for EN, small (MU), and EF regions. During ischemia (LPI and LF2), changes in TF and PL correlated in EN (r=.73) but not in MU (r=.42) or MU (r=.26) with PDI. Values (g/cm) depicted as a percent of baseline were: (µ±s) ve EN

Thus, doppler recordings enable identification of a subgroup of patients with advanced LV systolic dysfunction in whom arterial transport is diminished. This cohort of pts exhibits more severe impairment of functional class than pts with comparable reductions in LVEF. These data support the contribution of disturbed LV filling in the production of symptoms in pts with LV systolic dysfunction.

CARDIAC FUNCTION IN HEART FAILURE

THE ROLE OF IMPAIRED DIASTOLIC PERFORMANCE IN DETERMINING THE FUNCTIONAL CLASS OF PATIENTS WITH HEART FAILURE.

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The role of impaired diastolic performance in determining the functional class of pts with heart failure (CHF) remains uncertain. In this study, we hypothesized that, among CHF pts with similar ejection fractions (EF), we could identify a subgroup in whom diastolic dysfunction with diminished atrial transport was associated with reduced functional status. This goal was achieved and jub 3D due to other coronary artery disease or cardiomyopathy. Pulsed doppler recordings of transmural flow velocities were obtained from the mitral annulus area in apical 4-chamber view. Measurements included peak early (E) and late atrial (A) velocities in cm/sec. Functional classification was established clinically according to New York Heart Association. On the basis of atrial transport, pts were divided into two cohorts: Group 1(normal A) with A>30 cm/sec, 14 pts; Group 2 (normal A), A<30 cm/sec, 9 pts. No differences were observed between Group 1 and Group 2 pts in regard to age, heart rate, and incidence or mean grade of mitral regurgitation. However, pts in Group 2 were significantly more symptomatic and had a worse functional class than group 1 pts as follows:

<table>
<thead>
<tr>
<th>Functional Class</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>57%</td>
<td>36%</td>
<td>7%</td>
</tr>
<tr>
<td>Type 2</td>
<td>0%</td>
<td>22%</td>
<td>78%</td>
</tr>
</tbody>
</table>

Thus, Doppler recordings enable identification of a subgroup of patients with advanced LV systolic dysfunction in whom arterial transport is diminished. This cohort of pts exhibits more severe impairment of functional class than pts with comparable reductions in LVEF. These data support the contribution of disturbed LV filling in the production of symptoms in pts with LV systolic dysfunction.

REMOBRYOLOGIC EVALUATION OF THE DYNAMIC CARDIOMYOPLECTY BY AORTIC FLOW DOPPLER STUDY


Between January 1982 and March 1989, 10 pts (8 males and 2 females) had a cardiomyoplasty operation with a latex matrix fascia lata (WF), LV was stimulated and trained by a Medtronic cardiomyostimulator, 9/12 survivors had a more than 6 months postoperative assessment (full trained LD) with a Degaszios DFR 100 C and a Vigmed SD 100 device. Automatically computed LV stroke volume (SV), cardiac output (CO) were obtained from the aortic flow integration and recorded during 5 min without stimulation and then under 1.2 cardiac cycles stimulation of the LD without any changes in the patient or probe position. The average values of the SV and CO were expressed as the percentual variation of the stimulated cycle against the non-stimulated cycle (SV) and as the percentual variation of the CO under 1.2 stimulation versus the basal state.

3/9 pts didn't demonstrate any modification of the SV or the CO; 6/9 pts had a mean increase of SV of 25.6% (+12% to +42%) of the stimulated cycle against the non-stimulated one. CO had a mean increase of 11% (+7% to +13%) between the basal state and the 1.2 cycles LD stimulation.

Full trained LD stimulation and contraction increased SV and CO in 6/9 investigated pts at more than 6 months postoperatively. Serial echo-Doppler examination seems to be the more safe and investigative method for the LD training and hemodynamic effect monitoring.

CONTINUOUS WAVE DOPPLER ESTIMATION OF LEFT ATRIAL PRESSURE IN PATIENTS WITH CONGESTIVE HEART FAILURE AND MITRAL REGURGITATION.


A completely non-invasive method for determination of left atrial pressure (LAP) in patients with mitral regurgitation utilizing continuous-wave Doppler echocardiography has been devised. This technique was applied to 34 patients, aged 60±15 yrs, LVEF 26±10%, with congestive heart failure and Doppler-detected mitral reflux, and correlated with simultaneous catheter recordings of pulmonary capillary wedge pressure (PCWP) at end-expiration. Patients with atrial stenosis or LV outflow tract obstruction were excluded. LAP was estimated by first determining transmural pressure gradient (P) from continuous-wave Doppler measurements of mitral regurgitant jet velocity (V), using P=4V²; then subtracting P from simultaneous measurements of cuff systolic blood pressure (SBP), (SBP-P-LAP). Five of the 34 patients had inadequate Doppler tracings and were excluded. For the group, peak mitral regurgitant jet velocity was 4.5±0.8 m/s, peak SBP was 113±27 mmHg, and mean PCWP was 29±17 mmHg. Correlation of noninvasive estimates with mean PCWP was r=0.9, SEE=4 mmHg, p<0.001, y=0.6x + 7. In conclusion, continuous-wave Doppler echocardiography and systolic blood pressure may be used for accurate noninvasive estimation of left atrial pressure in patients with congestive heart failure and mitral regurgitation.