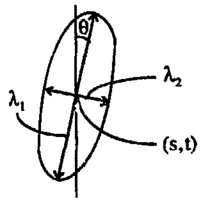
left ventricular dysfunction, and Θ was 0.22 ± 0.13 vs. −0.56 ± 0.34 radians ($p < 0.05$), respectively.



Conclusion: Eigenvector analysis of color M-mode Doppler filling patterns is a promising approach for classifying different LV filling patterns, with minimal influence from instrument settings.

2:45

757-4 Comparison of Valsalva Manoeuver and Pulmonary Venous Recordings in Diastolic Function Evaluation by Doppler Echocardiography

Eric Demeule, Jean G. Dumesnil, Denis Coulombe, Marie-Hélène LeBlanc. *Quebec Heart Institute, Québec, Canada*

It is well recognized that Doppler mitral tracings may be pseudonormal in patients with high left ventricular filling pressures. The two techniques proposed to distinguish between normal and pseudonormal Doppler mitral tracings are the use of the Valsalva manoeuver (V) and Doppler recordings of pulmonary veins (PVR). However, a comparison of the two techniques in the same patients has not been done. In this study, PVR and V were systematically attempted in 45 patients referred for echocardiography. The patient's diastolic function was classified using V as: 1) normal (E ≥ A at rest and during V); 2) relaxation abnormality (E < A at rest and during V); 3) pseudonormal (E ≥ A at rest and E < A during V) and also using PVR as: 1) normal (E ≥ A, width of PVR A wave ≤ mitral A); 2) relaxation abnormality (E < A, width of PVR A wave ≤ mitral A); 3) pseudonormal (E ≥ A width PVR A > mitral A). PVR A wave was not feasible in 29% of subjects whereas V was feasible in all.

Results:

Valsalva	Pulmonary Veins (PVR) Normal	Abnormal relaxation	Pseudo-normal	Not feasible
Normal	17	0	0	6
Abnormal relaxation	0	6	0	2
Pseudonormal	1	0	8	5

In conclusion, there is an excellent concordance ($p < 0.00001$) between V and PVR, which validates even more the two techniques. A complete PVR is however not possible in many patients.

3:00

757-5 In Patients With Chronic Congestive Heart Failure Loading Manipulations Improve the Prognostic Value of Doppler of Mitral Flow

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Mitral flow velocity patterns have an important prognostic value. However, they may change within the same patient according to loading conditions. To assess the additional prognostic value of these changes, simultaneous Echo-Doppler and hemodynamic studies were performed in 176 patients with chronic heart failure. In the 99 patients who had a restrictive mitral flow velocity pattern, defined by a deceleration time of early diastolic mitral flow (DT) ≤ 130 ms, Na nitroprusside (NTP) was infused, while the 77 pts who had a non-restrictive pattern (DT > 130 ms) underwent passive leg-lifting (LL). According to mitral flow pattern changes, patients were divided into 4 groups: G1 with persistent restrictive (DT ≤ 130 ms at baseline and after NTP); G2 with reversible restrictive (baseline DT ≤ 130 and > 130 ms after NTP); G3 with reversible non-restrictive (baseline DT > 130 and ≤ 130 ms after LL) and G4 with persistent non-restrictive pattern (DT > 130 ms at baseline and after LL). During a follow-up of 17 ± 9 months cardiac death and clinical decompensations were considered as events. *Results:* Patients with a restrictive pattern had a higher pulmonary wedge pressure (27 ± 6 mmHg) than those with a non-restrictive one (14 ± 6, $p < 0.001$). After NTP, pulmonary wedge pressure decreased more in G2 than in G1 (14 ± 4 vs. 23 ± 6 mmHg; $p < 0.001$) and, after LL, it increased more in G3 than in G4 (23 ± 7 vs. 16 ± 5 mmHg; $p < 0.001$). 35 of the 42 deaths (83%) and 51 of the 67 (76%) decompensations occurred in patients with a restrictive pattern at baseline.

	G1 (61 pts)	G2 (38 pts)	G3 (31 pts)	G4 (46 pts)	
Death	31 (51%)	4 (10%)	7 (22%)	2 (4%)	p < 0.001
Decompensation	41 (67%)	10 (26%)	11 (35%)	5 (11%)	p < 0.001

Conclusions: Heart failure patients with a baseline restrictive mitral flow pattern have a poorer prognosis than those with a non-restrictive pattern. The response of mitral flow patterns to NTP and to LL maneuvre further stratify patients into subgroups with strikingly different prognoses.

3:15

757-6 Left Atrial Properties Significantly Influence Doppler Indices of Early Left Ventricular Filling

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Left ventricular (LV) early diastolic filling volume is comprised of the volume stored in the left atrium (LA) during LV systole (LA reservoir function) and the volume directly transferred from the pulmonary veins to the LV (LA conduit function). To quantify these contributions, LA filling was controlled using a right heart bypass in 9 open-chest canines. The LA was filled via two pulmonary veins with all remaining pulmonary veins tied off. LA conduit function was eliminated for one beat by abrupt cessation of LA inflow at the time of early diastolic LA-LV pressure crossover using a computer-controlled pulmonary venous occluder. LAP, LVP (mmHg) and early LV filling Doppler E wave were determined in the control beats and occlusion (without LA conduit) beats. A wide range of heart rates (88–151 bpm) and cardiac outputs (1.5–3.5 L) were studied. When occlusion beats were compared to control beats, all pressure and Doppler variables decreased ($p < 0.05$, $n = 65$, paired t-test): Early diastolic LVP minimum (0.7 ± 2.6 vs. 2.2 ± 2.3); mean LAP during E wave (3.2 ± 3.5 vs 4.9 ± 3.2); peak E (50.8 ± 12.1 vs 70.4 ± 15.8 cm); and integral E (2.6 ± 1.5 vs 3.9 ± 1.7 cm^2). In conclusion, left atrial conduit function is an important determinant of left ventricular early filling and significantly affects the Doppler E wave. Thus, we urge caution when interpreting left ventricular diastolic function based on the Doppler E wave indices.

758 Electron Beam Computed Tomography Quantification of Coronary Calcium: Clinical Correlates

Tuesday, March 26, 1996, 2:00 p.m.–3:30 p.m.
Orange County Convention Center, Room 208

2:00

758-1 Specificity of Variable Electron Beam Computed Tomographic Calcium Scoring in Defining Angiographic Coronary Stenoses

John A. Rumberger, Vincent Yacyshyn, Patrick Sheedy, Jerome F. Breen, Robert S. Schwartz. *Mayo Clinic, Rochester, MN*

Coronary calcium using electron beam CT (EBCT) is highly sensitive for angiographic coronary disease (≥ 94%), but its mere presence cannot predict the degree of luminal narrowing. This suggests restricted clinical application of EBCT calcium to delineate patients in whom a positive test is specific for variable degrees of coronary stenoses. To determine if "cutpoints" for total coronary calcium "score" (or amount) can be defined in which specificity is excellent as it relates to maximum angiographic stenosis, we performed ROC curve analysis on 251 patients who underwent EBCT scanning in conjunction with clinically indicated coronary angiography. Results are below.

Angiographic Disease Severity	Total EBCT Calcium Score "Cutpoint" 90% Specificity	95% Specificity
≥ 20% Stenosis	26	36
≥ 30% Stenosis	75	159
≥ 40% Stenosis	106	175
≥ 50% Stenosis	159	368
≥ 70% Stenosis	284	746

Conclusion: Calcium scores determined non-invasively by EBCT can be used, for a predefined "false positive rate" or given specificity, as non-overlapping "cutpoints" which convey the likely severity of lumenal obstruction determined at coronary angiography.