1032-130 Dobutamine-Induced Obstruction May Not Predict Exercise-Induced Obstruction in Hypertrophic Cardiomyopathy

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Background: Alcohol septal ablation is increasingly used for the treatment of exertional dyspnea in patients with hypertrophic cardiomyopathy with obstruction (HOCM). The dobutamine (D)-provoked LV outflow pressure gradient (PG) is commonly used to determine which patients with HOCM should undergo the procedure.
Methods: To determine the clinical relevance of D-PG, we performed echocardiography during both D infusion and incremental upright bicycle exercise (Ex) in 10 consecutive HOCM patients referred for alcohol septal ablation.
Results: Mean age was 52 years, maximal D dose was 9.4 mcg/Kg/min, and maximal tolerated workload was 101 Watts. Mean data are as shown:

	Resting HR	Peak HR	SBP rest (mmHg)	SBP max (mmHg)	PG rest (mmHg)	PG max (mmHg)
D	64	82	114	124	34	104
Ex	74*	126**	127	158*	42	73**

* $p < 0.05$, ** $p < 0.01$, compared to D value
As compared with D, the average percentage increase in PG was much less with Ex (117% vs 326%) despite much greater increases in heart rate (HR) (74% vs 28%) and systolic blood pressure (SBP) (25% vs 8%). During Ex, patients achieved a much higher double product (20,147 vs. 10,123, $p < 0.001$) at a lower PG (73 vs. 104 mmHg, $p < 0.01$). Patients reported that the level of exertion during testing exceeded that encountered in daily life, and their measured exercise capacity was greater than expected from reported NYHA class: 1.7 vs. 2.5 ($p < 0.05$).
Conclusion: D-induced gradients are of uncertain clinical relevance in HOCM. When alcohol septal ablation is being considered exercise testing may be preferable to determine if a provocable PG is likely to contribute to a patient's exertional dyspnea.

1032-131 Impaired Coronary Circulation in Patients With Apical Hypertrophic Cardiomyopathy: Noninvasive Analysis by Transthoracic Doppler Echocardiography

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Background: Abnormal coronary flow and coronary flow reserve have been identified in patients with hypertrophic cardiomyopathy (HCM). However, characteristics of coronary circulation in patients with apical hypertrophic cardiomyopathy (ApHCM), that is a relatively rare form of HCM, have not been fully assessed. Recent advancement in transthoracic Doppler echocardiography (TTDE) provides noninvasive assessment of coronary flow velocity (CFV) pattern and reserve (CFVR) with coronary vasodilators in patients with various cardiac diseases. Thus, we designed this study to examine the characteristics of CFV and CFVR in patients with ApHCM. Methods: We analyzed the wall thickness of apical hypertrophied myocardium and basal posterior wall, and CFV and CFVR in the distal portion of the left anterior descending coronary artery (LAD) in 10 patients with ApHCM (63 +/- 6 years) and 10 control subjects (61 +/- 6 years). The apical to posterior wall ratio (AW/PW) and the characteristics of following CFV parameters at rest and during hyperemia (intravenous ATP: 0.14mg/kg per minute) were measured; mean diastolic velocity (MDV), time from beginning of diastole to peak velocity corrected by squared RR interval (TPV), and CFVR defined as a ratio of hyperemic MDV to MDV at rest. Results: A higher AW/PW and MDV, and a longer TPV were observed in ApHCM than those of control subjects at rest (1.7 +/- 0.1 versus 0.7 +/- 0.1, and 29 +/- 6 versus 17 +/- 5 cm/sec, and 5.2 +/- 1.0 versus 3.4 +/- 0.6 msec; p< 0.01, respectively). CFVR in ApHCM was significantly lower compared with in control subjects (1.8 +/- 0.4 versus 2.9 +/- 0.7; p<0.01), whereas MDV during hyperemia was similar between ApHCM and control subjects (53 +/- 13 versus 54 +/- 21 cm/sec). CFVR and MDV at rest in ApHCM showed significant correlations with AW/PW in the left ventricle (AW/PW=0.51*CFVR + 4.29; r=-0.84; p<0.01, and AW/PW=0.51*MDV + 2.48; r=0.74; p<0.05, respectively). Conclusion: CFV analysis by TTDE revealed that coronary circulation in the LAD was impaired in ApHCM because of increased resting coronary flow related to localized hypertrophy in the apical myocardium.

1032-132 An Analysis of Patients With Hypertrophic Obstructive Cardiomyopathy and Persisting New York Heart Association Class III Symptoms During Long-Term Follow-Up After Septal Ablation

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Background and introduction: In about 90% of the patients (pts) with symptomatic hypertrophic obstructive cardiomyopathy (HOCM), symptoms and outflow gradient (LVOTG) can significantly be reduced by septal ablation (PTSMA). Pts. with persisting heart failure symptoms during long-term follow-up after PTSMA are not characterized sufficiently. We analyzed our long-term cohort of 178 pts. treated between 1996 and 1998 with respect to persisting or recurrent NYHA functional class III symptoms.
Results: Hospital mortality was 1.7% (VF, pulmonary embolism, and pericardial tamponade in 1 pt. each). Mean CK rise was 599±300 U/l. A DDD-pacemaker (DDD-PM) had to be implanted in 13 pts. (7%). Mean follow-up time is now 55±15 months, 8 pts. (5%) were lost to follow-up. Out of the 167 cases analyzed, 12 pts. (7%) underwent a re-PTSMA and 4 (2%) a myectomy. These cases included, 156 pts. (88%) had complete elimination of

obstruction, and151 pts. (85%) reported sustained symptomatic improvement at their last follow-up.
Persisting or recurrent class III symptoms, however, were reported by 16 pts. (10%). LVOTG recurrence or persistence was the suspected reason in only 2 of these cases, 8 pts. were free from LVOT obstruction, and 6 had provocable gradients <60 mm Hg considered hemodynamically irrelevant. The leading reason for persisting class III symptoms despite satisfactory LVOTG reduction were marked obesity (BMI>30/m^2) in 5, severe diastolic LV dysfunction in 5, and coexistent pulmonary disease in 4 pts. 9 pts. (5%) died during long-term follow-up: due to stroke (n=3), extracardiac disease (n=3), or suspected sudden cardiac death (n=3).
Conclusions: PTSMA results in a persistent LVOTG reduction and symptomatic improvement during long-term follow up. Peri-interventional and long-term mortality seem to be at least comparable to surgical myectomy. Pts. with marked obesity, coexistent pulmonary disease, and advanced diastolic LV dysfunction are less likely to have symptomatic benefit from LVOTG reduction, and need additional treatment of these abnormalities.

POSTER SESSION

1033 Exercise Physiology and Testing: Methodology and Mechanisms

Sunday, March 07, 2004, Noon-2:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1033-109 Assessing the Need for Repeat Baseline Exercise Tests in Heart Failure Patients: Early Experience From HF-ACTION

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Background: Aerobic capacity is an important outcome in heart failure trials and is often quantified by expired gas analysis during exercise testing. However, patient familiarization can lead to improvements in exercise parameters over serial testing. Thus, many trials require multiple baseline tests. In clinical practice, however, a single test is routinely used for prognosis or exercise prescription.
HF-ACTION is a multi-center randomized controlled trial designed to evaluate the effect of exercise training on morbidity and mortality in 3,000 patients with an ejection fraction $\leq$ 35% and NYHA class II-IV symptoms. The protocol specifies that two cardiopulmonary exercise tests (CPXs) be conducted at baseline. After the first 100 subjects, an analysis was planned to determine if multiple baseline tests are necessary; the results are reported here.
Methods: Each subject underwent two maximal CPXs using a Modified Naughton protocol. Baseline tests were separated by $\geq$ 48 hours but $\leq$ seven days. Exercise time, VO_2, heart rate (HR), respiratory exchange ratio (RER), and rating of perceived exertion (RPE) were measured. Quality control included investigator training, submission of sample tests, and oversight by a core lab.
Results: n=85

	mean T1	mean T2	SD of (T2-T1)	% of tests T2>T1	% of tests T1>T2	p-value (t-test)
Exercise time (secs)	599	626	83.6	65	31	0.003*
Peak VO_2 (ml/kg/min)	14.84	14.92	1.99	55	37	0.71
Peak RER	1.11	1.12	0.08	63	33	0.33
Peak HR (bpm)	120	121	10.44	55	38	0.36
Peak RPE (Borg)	17.2	17.6	1.63	45	19	0.021*
Training HR based on 60% heart rate reserve (HRR) (bpm)	100.1	101.1	8.33	55	45	0.28

Conclusion: With appropriate quality control, serial baseline exercise tests do not result in improvements in HRR or maximum aerobic capacity. Therefore, when peak VO_2 and HRR are used as outcome measures or for exercise prescription, only a single baseline test is needed.

1033-110 Lowered Resting Heart Rate in High Fit Healthy Subjects Is Caused by a Lowered Intrinsic Heart Rate, Not by Elevated Parasympathetic Tone

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Background. High fit subjects have a lower resting heart rate than low fit subjects. Whether this is caused by an altered resting sympathetic or parasympathetic tone or by an altered intrinsic heart rate is still a matter of debate.
Methods. We studied 21 low fit (VO2max 39.8 ± 6.3 ml×kg^{-1}×min^{-1}) and 23 high fit (VO2max 57.6 ± 5.5 ml×kg^{-1}×min^{-1}) healthy young male subjects. Adopting the Rosenblueth-Simeone model for autonomic heart rate modulation, HR=$m \cdot n \cdot$ IHR, we measured resting heart rate (HR) and, with two-stage complete pharmacological autonomic block-