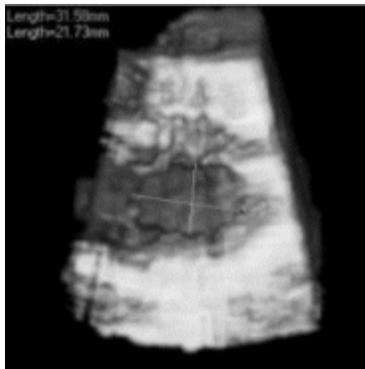


as compared to TEE. Freehand scanning is faster but similarly accurate as rotational scanning thus allowing for accelerated workflow without quality sacrifice.



1150-151 Patients Benefit From Intracardiac Echocardiography Used as a Novel Guiding Tool for Device Closure of Interatrial Communications

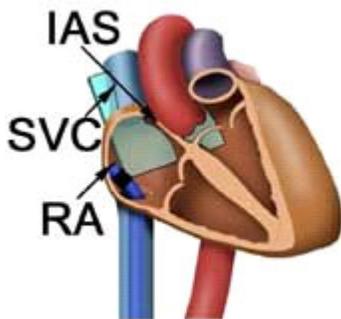
Thomas Bartel, Thomas Konorza, Holger Eggebrecht, Tiko Ebradlidze, Raimund Erbel, University Essen-Duisburg, Essen, Germany

Background: This study sought to evaluate safety and radiation exposure when using intracardiac echocardiography (ICE) to guide transcatheter closure of interatrial communications.

Methods: Fifty-two patients (29 male, 23 female, mean age 48±14 years) undergoing device closure of atrial septal defect (n=10) or patent foramen ovale (n=42) had the procedure guided by ICE. Therefore, an AcuNav-catheter was inserted via the inferior vena cava into the right atrium (Figure: IAS = interatrial septum; RA = right atrium; SVC = superior vena cava). All procedural stages were completely guided by ICE, including imaging of the interatrial communication during balloon sizing, device unfolding and release, and during the final check for adequate positioning.

Results: Especially the spatial relationship between device and cardiac structures (i.e. ascending aorta, interatrial septum and superior vena cava) was accurately demonstrated. No severe complications, including any related to ICE, were seen. Fluoroscopic time needed for the procedure including balloon sizing was 6,1±1,4 minutes. Neither sedation nor anesthesia were required.

Conclusions: ICE is a safe tool to guide device closure of interatrial communications. For the patient, procedural stress and radiation exposure are negligible. ICE can be considered the guiding tool of choice for device closure, particularly when long or repeated echocardiographic viewing is required.



1150-152 Utility of Intracardiac Echocardiography to Guide Radiofrequency Catheter Ablation of Ventricular Tachycardia of Different Etiologies

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Background: Ventricular tachycardia (VT) may originate from an anatomical substrate. Radiofrequency catheter ablation (RFCA) is a treatment option in a selected population of drug refractory VT patients (pts), but is associated with a risk of complications. Identification of anatomic abnormalities to predict the area of arrhythmogenicity and methods to monitor the occurrence of intra-procedural complications are mandatory.

Purpose: To assess the value of intracardiac echocardiography (ICE) to guide RFCA of VT: Identification of VT substrate, guiding of catheters and monitoring of potential complications.

Methods: Sixteen pts (13 men, mean age 55±18 yrs) with drug refractory hemodynamically stable VT were studied. VT was post-ischemic in 7 pts, secondary to arrhythmogenic right ventricular dysplasia (ARVD)/hypertrophic cardiomyopathy in 4 pts, and idiopathic in

5 pts. ICE was performed using a 10 F multi-frequency (5-10 Mhz) phased array transducer (Acunav, Siemens) positioned in the right ventricle. On initiation of all procedures, ventricular function and anatomy was investigated with ICE. VT mapping and ablation was performed using standard techniques including pace and entrainment mapping.

Results: Twenty-nine VTs were treated (cycle length 365±115 ms, 1.8 VT/pt). One pt did not undergo RFCA because of intracardiac thrombus, detected with ICE. Localized ventricular aneurysms were identified in 6 post-infarct pts and in 2 pts with ARVD. At these sites early-activated endocardial areas were identified during VT mapping. Catheter position and tip-tissue contact was monitored with ICE. Procedural success (non-inducibility of hemodynamically stable VT after RFCA) was achieved in 14 pts (88%). Mean procedure time was 197±53 min and fluoroscopy time 30±15 min. Procedure related complications did not occur.

Conclusion: ICE is safe and feasible in guiding VT ablation procedures. ICE can be used to identify the VT-substrate, to ensure adequate tissue tip contact and to safely manoeuvre catheters within the ventricles.

POSTER SESSION

1151 Stress Echocardiography: New and Not So New

Tuesday, March 09, 2004, Noon-2:00 p.m.

Morial Convention Center, Hall G

Presentation Hour: 1:00 p.m.-2:00 p.m.

1151-141 Limitation of Stroke Volume During Dobutamine Stress by Left Ventricular Filling Time in Patients With Coronary Artery Disease

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Background: Stress-induced left ventricular (LV) dysfunction in patients with coronary artery disease (CAD) may be associated with significant changes in LV filling pattern, particularly filling time, that may limit maximum stroke volume (SV). We aimed to determine relative filling time compared to absolute diastolic filling time (diastolic time reserve) in normal subjects and in patients with CAD, and to ascertain the relationship between diastolic time reserve and changes in SV during pharmacological stress.

Methods: 69 subjects were studied during dobutamine stress; 33 were normal controls and 39 had CAD with normal LV systolic function (EDD 5.0±0.5cm, ESD 3.3±0.5cm). Relative filling time, expressed as a percentage of total diastole, was calculated by dividing LV filling time (LVFT) by total diastolic time (measured as the interval between aortic valve closure and mitral valve closure). Stroke volume (SV) was measured using Doppler echocardiography at the level of the LV outflow tract. All measurements were made at rest and repeated at peak stress.

Results: In normal controls, relative filling time increased with stress (from 85±3% to 92±2%, p<0.001), an increase of 7% that suggested the presence of diastolic time reserve. In these subjects, SV increased (from 69±17mls to 96±19mls, p<0.001). In CAD, relative filling time was not different from controls at rest, but decreased with stress (from 83±5% to 74±5%, p<0.001), representing a loss in diastolic time reserve of 9%. In these patients, SV failed to increase (rest: 76±20mls, stress: 74±16mls, p=ns). Stress-induced changes in diastolic time reserve correlated with changes in SV in patients with CAD (r=0.60, p<0.001), but not in controls (r=0.21, p=ns).

Conclusion: In patients with CAD, stress-induced ischemic dysfunction is associated with loss of diastolic filling reserve that determines stroke volume. This loss of early diastolic reserve may itself affect diastolic coronary artery filling, and consequently perpetuate myocardial perfusion instability.

1151-142 Can Symptomatic Sinus Deceleration During Dobutamine Stress Echocardiography Be Prevented?

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Background: Stimulation of parasympathetic activity that leads to reflex paradoxical sinus deceleration may occur during early stages of Dobutamine Stress Echocardiography (DSE) and may also prevent achievement of target heart rate. **Method:** We therefore studied 465 consecutive pts mean age (60 ± 2) who underwent DSE with two different protocols. Group A (A=265 pts) underwent a standard DSE protocol with incremental dose of Dobutamine (D) (10 to 50) at 3 minute interval and up to 1.2 mg Atropine (A) at 0.4 mg doses at 40 mg of D if needed. Group B (n=200) underwent same protocol except for early administration of 0.4 mg A at the beginning of 20 mg dose of D and dose has been repeated if needed. Sinus deceleration (SD) was defined reduction in heart rate >10 bpm lasting >3 minutes at 20 or higher rate of D. **Results:** Overall SD documented in 50 of 456 pts (42 for Group A, 8 in Group B). SD was more associated with females (62% vs. 38% p=0.02); older (63 ± 14 vs. 54 ± 7, p=0.01) and smaller BSA (1.6 ± 0.1 vs. 1.9 ± 0.2; p=0.02). SD was more frequent in higher EF (66 ± 4 vs. 56 ± 6; p=0.06). Sinus deceleration more common in Group A resulting more sub maximal testing. (Table) **Conclusion:** Older females with smaller BSA and with hyperdynamic left ventricular function are more susceptible to sinus deceleration during Dobutamine Stress Echocardiography. Early administration of Atropine can effectively prevent sinus deceleration and help to reach maximal heart rate.

	Group A	Group B	P
SD	(16%)	(4%)	0.01
Sub maximal test	(24%)	(6%)	0.01
Average D dose	42 ± 7	36 ± 0	0.01

1151-143 Regional Wall Motion Abnormalities During Dobutamine Stress Echocardiography in Patients With Systemic Sclerosis

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Background: Systemic sclerosis (SSc) is a chronic connective tissue disorder of unknown etiology, characterized by cutaneous and visceral involvement. The pathogenesis of the cardiac lesion in SSc is controversial, but the primary disorder of microvasculature with diffuse arteriolar and capillary lesions could precede any fibrosis, thus causing ischemic disorder to the heart. Dobutamine stress echocardiography (DSE) is a sensitive predictor of coronary artery disease. This study was performed to assess the value of DSE for noninvasive diagnosis of cardiac involvement in patients with SSc without clinical evidence of heart disease and to determine if abnormal responses to dobutamine can be explained by a decreased coronary flow velocity reserve (CFVR)

Methods: We studied 27 patients with SSc without clinical evidence of heart disease, (15 with diffuse form and 12 with localized form of SSc), age 54±12. All patients underwent high dose DSE testing (5-40 mcg/kg/min) and evaluation of CFVR in the left anterior descending coronary artery with contrast transthoracic Doppler during adenosine infusion (140 µg/kg/min in 5 minutes). Patients were divided into two groups based on the absence (group A; n=15) or presence (group B; n=13) of regional wall motion abnormalities (RWMA) on DSE.

Results: In 13 out of 28 pts (46%) with SSc, we found RWMA during DSE with patchy distribution. Both groups showed normal CFVR values (group A, 2.76±0.7; group B, 2.26±0.4), but CFVR in group B was statistically reduced compared to group A (p=0.03).

Conclusion: This study showed that many patients with SSc, without clinical evidence of heart disease, have inducible RWMA during DSE with patchy distribution. Furthermore, CFVR reduction suggests the role of a partial coronary microvascular dysfunction in these group of patients.

1151-144 Distal Left Anterior Descending Flow Reserve by Dobutamine Versus Adenosine Transthoracic Doppler Echo During Conventional Dobutamine Echocardiography: Feasibility and Accuracy for Left Anterior Descending Patency

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Background: There are a few data for coronary flow reserve (CFR) post dobutamine (D)infusion.

We aimed to evaluate the diagnostic accuracy for significant LAD stenosis using CFR either during DSE or post adenosine (AD)infusion.

Patients-Methods: We studied 101 consecutive pts (age 59±9, 17 women) with known or suspected CAD who were referred for DSE.

CFR was estimated:

1. at the stage of 30mg/kg/min of DSE (CFRdob)
2. 30 minutes post DSE after adenosine (CFRaden).

All pts underwent coronary angiography within a period <3months.

Results:

1. Distal LAD flow was detected in all 101 pts (feasibility 100%). In 4/101 pts, contrast had to be used. Distribution of LAD stenosis was as follows: 70%: 21 pts (12 with a >90% stenosis).
2. ROC analysis for prediction of LAD % diameter stenosis gave the following results :

LAD% stenosis	CFR	Cut off	Sens	Spec	p
>50	aden	1.82	0.51	0.98	<0.0001
>50	dob	1.3	0.3	0.80	≅0.06
>70	aden	1.8	0.92	0.94	<0.00001
>70	dob	1.3	0.52	0.84	<0.0001

CFR values for both Aden and Dob were related with % LAD diameter stenosis with cube function :

CFR adenosine = -4.7 (LAD%)³ +0.00056(LAD%)²-0.034(LAD%)+3.2 (F=34.5, p<0.00001)

CFR dobutamine = -0.000063 (LAD%)³ +0.00087(LAD%)²-0.0378(LAD%)+2.2 (F=12, p<0.00001)

CFR aden and CFR dob were concordant for LAD patency in 77 % of pts (kappa coefficient 0.37 (p70% was 0.59, and it increased to 0.79 in stenosis<70%.

Conclusions:

1. High-resolution ultrasound enhances feasibility of LAD CFR
2. CFR by AD has excellent accuracy for LAD stenosis interrogation.
3. CFR evaluated at DSE has lower values than CFR by adenosine. However, CFR estimated during DSE has great specificity to exclude significant LAD stenosis.

1151-145 Accuracy of Strain Rate Techniques for Identification of Viability at Dobutamine Stress Echo: A Follow-Up Study After Revascularization

Lizelle Hanekom, Carly Jenkins, Leanne Short, Thomas H. Marwick, University of Queensland, Brisbane, Australia

Background. Myocardial viability (VM) assessment based on wall motion scoring (WMS) with dobutamine echo (DbE) is difficult and subjective. New quantitative techniques such as strain rate imaging (SRI) correspond with isotopic techniques but their ability to predict functional recovery (FR) after revascularization is unclear.

Methods. Stable post-MI pts (n=43, age 63±9, EF 36±6%) underwent SRI during DbE. WMS evidence of VM was based on lowdose augmentation at DbE. SR, end-systolic strain (ESS), post-systolic strain (PSS) and timing were analyzed at rest and low dose in abnormal segts. Pts were followed for 9±12 months; FR was defined as segt improvement on post-revascularization images.

Results: Of 180 segts with abnormal resting function, 83 showed FR and 97 did not. Resting parameters were not predictive of recovery; resting post-systolic shortening had a sensitivity and specificity <50%. Viable vs nonviable segts showed differences in low-dose SR (0.9±0.6 vs 0.4±0.5/s, p<0.001, optimal cutoff >0.6), SR increment (0.5±0.5 vs 0.1±0.6/s, p<0.001, cutoff >0.23), ESS (11.6±9.2 vs 4.7±9.3, p<0.001, cutoff >8.5), ESS increment (4.9±9.9 vs 0.7±6.2, p<0.001, cutoff >3.4) and time to ES (0.31±0.9 vs 0.38±0.09, p<0.001, cutoff <0.32). Sensitivity and specificity of quantitative parameters were comparable to WM analysis (Table).

Conclusions. SR and strain responses to DbE are a feasible marker of viability, comparable to WM assessment.

	WM scoring	Lowdose SR	SR increment	Lowdose ESS	ESS increment	t end-systole
Sensitivity (83 recovered)	69%	69%	70%	69%	60%	59%
Nonviable (97 no recovery)	62%	57%	53%	65%	63%	77%

1151-146 Assessment of Myocardial Viability in Patients With Myocardial Infarction: Comparison of Contrast-Enhanced Magnetic Resonance Imaging With Dobutamine Stress Echocardiography

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Background: Contrast-enhanced magnetic resonance image (CE-MRI) has been shown to identify necrotic tissue in ischemically damaged myocardium. Low-dose dobutamine stress echocardiography (LDSE) is used for assessment of myocardial viability.

Objective:We sought to compare CE-MRI with LDSE for assessment of myocardial viability in patients with myocardial infarction. **Methods:** Fifty-two patients with acute myocardial infarction underwent CE-MRI and LDSE. All patients treated with angioplasty and stenting in the acute phase. Delayed CE-MRI contrast enhancement patterns were examined 15 minutes after injection of 0.1 mmol/kg gadolinium diethylenetriamine pentaacetic acid (Gd-DTPA). LDSE protocol (5 and 10 ug/kg/min in 5-minute) was used. The transmural extent of hyperenhanced regions was postulated to represent the transmural extent of non-viable myocardium. The extent of regional contractility at the same locations was determined by LDSE. Regional wall motion was assessed with a 16-segment model. **Results:** Three hundred sixty three of the 832 myocardial segments were analyzed to infarct segments, and 263 infarct segments analyzed had viability by LDSE. Two hundred forty nine of the 263 viable myocardial segments (95%) had subendocardial hyperenhancement by delayed CE-MRI. By LDSE, 100 infarct segments were analyzed to non-viable myocardium, and 87 of the 100 non-viable segments (87%) had the transmural extent of hyperenhancement by delayed CE-MRI, and the remain 13 segments had hyperenhancement more than 75percent transmural extent of myocardial tissue of tissue (mean: 82±5%). **Conclusions:** Delayed CE-MRI and LDSE allow assessment of myocardial viability with myocardial infarction. LDSE and delayed CE-MRI have a good correlation in evaluation of myocardial viability.

1151-147 Incremental Value of Transient Poststress Left Ventricular Dysfunction After Dobutamine-Atropine Stress Echocardiography

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Background: Dobutamine stress echocardiography (DSE) is an established technique for the diagnosis of coronary artery disease (CAD). Ischemia is defined by regional reduction of myocardial thickening or inward motion of endocardial borders. However, the evaluation of DSE is subjective and experience dependent and would be improved by additional objective parameters. The aim of the study was to test the additional role of volumes changes during DSE for the assessment of the extent of myocardial ischemia.

Methods: The study includes 100 consecutive patients with suspected or known CAD (mean age 61± 11 years; 73% males) referred for DSE: 50 patients with and 50 without stress-induced ischemia assessed by new wall motion abnormalities, using a 16-segment, 5-point score. All cardiac risk factors and hemodynamics during DSE were noted. Ventricular volumes were measured with Biplane Simpson's method at the main DSE stages (rest, low dose, peak and recovery).

Results: In 50 patients with documented ischemia male gender, angina pectoris were more frequent (p < 0.001). No differences were noted between the two groups in respect