Results: At 1 month, sinus rhythm was maintained in 11 (group 1, 41%), and AF relapsed in 16 (group 2, 59%; 2 within 24 hours, 13 within 15 and 1 within 30 days) patients. Associated heart diseases, AF duration, and baseline left ventricular mass index and systolic function, LA biplane maximum (group 1: 90±28 ml, group 2: 90±19, p=ns) volume, and estimated right ventricular systolic pressure were similar in the 2 groups. Baseline LA reservoir was reduced (when compared to value at 30 days post cardioversion of group 1) in both groups (group 1: 16±6 vs 28±7 ml, p<.001; group 2: 13±6 vs 28±7 ml, p<.001; group 1 vs 2, p=ns). Mean LA volumes did not change during follow-up. In group 1, LA reservoir increased progressively during follow-up, with maximum increase rate at 24 hours (baseline= 16±6 ml, 24 hours= 25±9, p<.05), whereas LA systolic function increased significantly only at 30 days (2 hours = 5±7%, 30 days= 15±6, p=.02). In group 2, LA reservoir and systolic functions changes during follow-up were not significant. At multivariate analysis, lack of reservoir increase in the first 24 hours after cardioversion was related to (and predicted) relapse of AF at 30 days (p<.001).
Conclusion: LA reservoir is impaired during AF, and both reservoir and systole are stunned after cardioversion. However, LA reservoir recovers earlier than LA systolic function, and the extent of this recovery in the first hours after cardioversion predicts maintainance of sinus rhythm at 1 month.

1149-161 Effects of Body Size, Stroke Volume, Age, and Gender on Left Atrial Dimension

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Background: Previous studies with small samples have reported left atrial enlargement is strongly associated with obesity but weakly with age and not with gender. To further examine the determinants of LA size, the antero-posterior dimensions (LAD) from four, large, clinical studies of previous anorexigen users and matched controls were examined to identify the relationship of body size (height, weight, BSA, and BMI), age, gender and stroke volume to echocardiographic values.
Methods: LA dimension was measured from 2-D targeted M-mode recordings. Blood pressure, heart rate, anthropometrics and medical history were obtained; patients with co-morbid disease (CMD) conditions (cardiovascular) were identified and excluded from analysis. Ninety-five percent population ranges for LAD based on multiple regression models were constructed.
Results: Subjects (N=4911) were predominantly white (88%), female (81%), obese (body mass index (BMI) range: 19-74 kgm^2, BSA range: 1.4 –3.1 m$^{2)}$, age range: 18-80 years and 10% had CMD. LAD was similar in anorexigen treated patients (means across cohorts: 33.4±4.0 to 38.7±4.7mm) and controls (33.4±4.2 to 38.2±4.7mm) (P=0.70 to 0.10) and therefore both groups were analyzed together. BSA and BMI were the most significant predictors (P<0.001) of LAD followed by stroke volume (P<0.001). Across cohorts LAD correlated with BSA from r=0.38 to r=0.45. The LAD/BSA index also highly correlated with BSA and was significantly higher in males. Age was a significant predictor of LAD in three cohorts (2 mm increase per 30 years). LAD was 2.7±0.3 to 3.5±0.3 mm higher in men than women (P<0.001). Multiple regression models were constructed with BSA, age, sex and stroke volume accounting for 15 – 30% of the total variance in LAD among the cohorts. The prevalence LAD > 40mm was found in 23.6 percent of subjects without CMD.
Conclusion: LAD significantly increases with height and weight and therefore, BSA.Population ranges for LAD dimensions have been identified and values should be corrected for BSA, age and gender during clinical evaluation. LAD/BSA has recently been reported as a good measure of LA size, independent of body size, however we did not find this.

1149-162 Sinus Rhythm Restoration After the Maze Operation and Relationship Between Pre- and Postoperative Left Atrial Volume

Hyelim Oh, Jinho Choi, Sangcheol Lee, Jidong Sung, Hyeoncheol Gwon, Junesoo Kim, Eunseok Jeon, Dukkyung Kim, Sanghoon Lee, Pyowon Park, Kyungpyo Hong, Jeongeuy Park, Jungdon Seo, Sungkyunkwan University School of Medicine, Samsung Medical Center, Seoul, South Korea

Background: The maze operation is effective for the restoration of sinus rhythm in patients with atrial fibrillation (AF). The purpose of this study was to identify the predictors of sinus rhythm restoration and to investigate changes in left atrial volume and diameter after the maze operation.
Methods: The subjects for the study were 21 patients who underwent open-heart surgery in conjunction with the maze-III operation for chronic atrial fibrillation from October 2002 to April 2003. Electrocardiographic and transthoracic echocardiographic studies were prospectively made preoperatively and at 3 months postoperatively, respectively. Left atrial volume corrected for body surface area (LAV/BSA), and left atrial diameter (LAD) measured in M-mode were assessed.
Results: Sinus rhythm was restored and maintained in 17 of 21 patients (80.9%). Between the group with successful restoration of sinus rhythm (group A; n=17) and the group with unsuccessful restoration (group B; n=4), there was no difference in age, gender, and NYHA functional class. However, the duration of AF in group A was significantly shorter than in group B (3.2±2.4 years versus 15.8±7.0 years, p=0.024). Group A and group B did not show any difference in pre-operative left ventricular ejection fraction and left atrial diameter. However, pre-operative LAV/BSA in group A was significantly smaller than in group B (84±23 mL/m^2 versus 135±30 mL/m^2, p=0.025). In group A, LAV/BSA (84±23 mL/m^2 versus 56±15 mL/m^2, p<0.001) and LAD (60±9 mm versus 51±8 mm, p=0.001) significantly decreased three months after operation. In group B, however, no difference was found in LAV/BSA (135±30 mL/m^2 versus 116±32 mL/m^2, p=NS) and LAD (68±3 mm versus 66±8 mm, p=NS). Post-operative LAV/BSA correlated to pre-operative LAV/BSA (r=0.50, p=0.04) and the duration of AF (r=0.74, p=0.002).
Conclusion: Pre-operative left atrial volume measured by echocardiography and the duration of atrial fibrillation were predictors of successful sinus rhythm restoration after the maze operation. Significant reduction of left atrial volume after the maze operation was found in the patients with sinus rhythm restoration.

POSTER SESSION

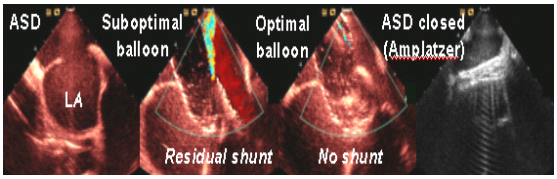
1150 Echocardiography During Septal Defect Closure, Dysrhythmia Ablations: Intracardiac Echocardiography Is Nice and So Is Three-Dimensional Echo

Tuesday, March 09, 2004, Noon-2:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1150-149 Intracardiac Echocardiography Aids Decision-Making During Percutaneous Device Closure of Patent Foramen Ovales and Atrial Septal Defects in Adults: Lessons From 223 Procedures in the Cardiac Interventional Laboratory

Luqin Cao, Zheng Liu, Amy Loyd, Heider Arjomand, Andrey Espinoza, Julie Wendell, Patrick Coon, Sheldon Goldberg, William Kussmaul, Daniel McCormick, Mani Vannan, Drexel Univeristy College of Medicine, Philadelphia, PA

Background: We have shown the value of ICE and fluroscopy to guide percutaneous device closures (PDCs) of PFOs and ASDs, but have not shown whether ICE impacts decision-making during PDCs. **Methods:** 223 PDCs were done between May '01 and Sept.'03 with CardioSEAL® (n=106) and Amplatzer® (n=117) devices. 163 PFOs and 60 secundum ASDs were occluded with ICE (AcuNav™) guidance. **Results:** Detailed anatomy of the chambers, vessels, valves and the IAS (limbii, fossa and PFO and/or ASD) was imaged with 2-D, color and spectral Doppler in all patients. In 48 patients (21 %), ICE data directly influenced: 1) *type and size of device* based on tunnel length, marked hypertrophy of the IAS limbus or an aneurysmal septum (n=31) , 2) *optimal balloon inflation sizing* using ICE color-Doppler obliteration of shunt in large ASDs (n=4), ***Fig. below***, 3) *type and placement of multiple devices* in fenestrated IAS defects (n=3), 4) complex PDCs in the setting of *failed surgical patch repair* of large ASDs (n=2), 5) assess the effect of IAS shunts on *systemic desaturation* by ICE color-Doppler during balloon occlusion (n=4), 6) *decision to defer to surgery* when the ASD rim was dynamically altered during balloon inflation so that there was no discrete waist (n=4). **Conclusions**: Based on our large experience, ICE during PDCs is a valuable adjunct to fluroscopy for successful procedural outcome. Furthermore, in about 20 % of the cases it provides unique data not available by fluroscopy which directly impacts decision-making in the interventional laboratory.

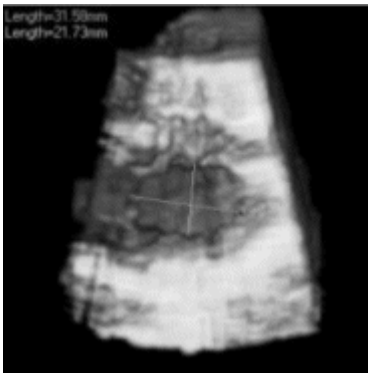


1150-150 Freehand and Rotational Transthoracic Three-Dimensional Echocardiography Improve the Quantification of Atrial Septal Defect Size Before Percutaneous Closure

Jaroslaw D. Kasprzak, Michal Ciesielczyk, Pawel Dryzek, Piotr Lipiec, Andrzej Sysa, Michal Plewka, Jaroslaw Drozdz, Maria Krzeminska-Pakula, Medical University of Lodz, Lodz, Poland, Polish Mother's Health Centre, Lodz, Poland

We aimed to compare the feasibility and accuracy of freehand (FH)vs rotational (RO) transthoracic 3-dimensional echocardiography (3DE) for the planimetry of secundum atrial septal defect (ASD) before interventional closure with Amplatzer device.
Method. We studied 32 children and young adults (aged 3-32 years, mean 12±7) prior to Amplatzer implantation using 3DE and TEE. 3D-RO was performed at 3° intervals (TomTec Echoscan 3.0 - 18 pts) 3D-FH by sweep scan, 40-50 slices (EasyScan, 14 pts). Long and short diameter of defect were measured TEE and 3D and compared to stretched balloon and device waist diameter.
Results. FH provided superior data density and shorter study time (28 / 16 min, p<0.001). ASD tissue rims could be measured in all cases. Mean stretched/Amplatzer diameter was 21±5/22±6mm and was severely underestimated by TEE and much less by 3DE: 13±4 vs 18±5 mm (p<0.001), mean difference of 2,6±3,8mm by 3DE (p<0.001) and 7.3±3.6mm by TEE. The results of 3DE had good correlation (better for FH than RO, r=0,89 and 0,80) and close agreement to stretch and device size diameter (r=0,80 and 0,83 resp.) with more underestimation of device size for FH than RO (difference 4.6 vs 1.1mm).
Conclusions. Transthoracic 3DE is a robust technique, improving the quantification of ASD diameter and more reliable prediction of necessary Amplatzer size in young patients

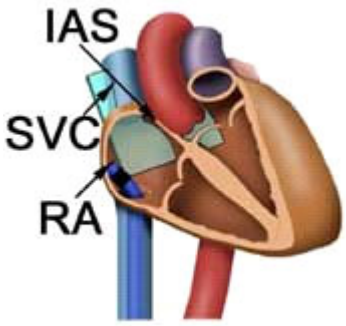
as compared to TEE . Freehand scanning is faster but similarly accurate as rotational scanning thus allowing for accelerated workflow without quality sacrifice.



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 interatial 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**

Monique R.M Jongbloed, Jeroen J. Bax, Philippine Kies, Alida E. Borger van der Burg, Katja Zeppenfeld, Ernst E. van der Wall, Martin J. Schalij, Leiden University Medical Center, Leiden, The Netherlands

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 hemodynamic 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 no 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**

Alison Duncan, Derek Gibson, Michael Henein, The Royal Brompton Hospital, London, United Kingdom

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?**

Melda S. Dolan, Noel Rubio, Masarrath Moinuddin, Jan St. Vrain, Alan Maniet, Arthur J. Labovitz, Saint Louis University School of Medicine, St. Louis, MO

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.