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-scale 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, age, sex and stroke volume accounting for 15–30% of the total variance in LAD were significant predictors of LAD in three cohorts (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 (r=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 LA diameter 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. Logistic regression analysis showed that the absence of co-morbid disease (CMD) conditions (cardiovascular) were identified and excluded from analysis. Ninety-five percent population ranges for LAD based on multiple regression analysis. Ninety-five percent population ranges for LAD based on multiple regression analysis.

Results: Subjects (N=4911) were predominantly white (88%), female (81%), obese (body mass index (BMI) range: 19-74 kg/m²), BSA range: 1.4–3.1 m², age range: 18-80 years and 10% had CMD. LA diameter was similar in anorexigen treated patients (means across cohorts: 39.4±4.0 to 38.7±4.7 mm) and controls (39.4±4.2 to 38.2±4.7 mm) (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 LA diameter 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. Logistic regression analysis showed that the absence of co-morbid disease (CMD) conditions (cardiovascular) were identified and excluded from analysis. Ninety-five percent population ranges for LAD based on multiple regression analysis.

Patients Benefit From Intracardiac Echocardiography Used as a Novel Guiding Tool for Device Closure of Interalatrial Communications

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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.

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 hemodynamic stable VT were studied. VT was post-ischemic in 7 pts, secondary to arhythmogenic 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/p). 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 119±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.