34 Can an exercise evaluation of heart function before deciding cardiac resynchronization therapy help in defining the risk of non-response to the therapy?

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Background.— Mechanical dyssynchrony along with its role in cardiac resynchronization therapy (CRT) has been studied for over 10 years now. Still, there are no recommendations for the use of imaging techniques to best select the patients who are the most likely to positively answer to CRT. We sought, then, to test up-to-date echocardiographic tools at rest and during a standardized exercise.

Patients and results.— Thirty out of 197 patients were prospectively recruited. All were chronic heart failure patients in sinus rhythm, optimally pharmacologically treated but still in NYHA III and able to perform some degree of exercise. They were followed at 6-month. Patients were responders according to a decrease in left ventricular end-systolic volume > 15%. Responders and non-responders were significantly different at baseline according to QRS-width (162 ± 18 vs. 144 ± 22 ms, P = 0.01), left atrial volume (33 ± 10 vs. 53 ± 12 mL/m², P < 0.001), mitral inflow duration/RR at rest and exercise (0.32 ± 0.05 vs. 0.37 ± 0.08, P = 0.03), left pre-ejection time delay (129 ± 36 vs. 104 ± 34, P = 0.03) right atrial area, right ventricular annulus s’ and TAPSE at rest and during exercise (TAPSE exercise 21.2 ± 2.9 vs. 16 ± 6.5, P = 0.004). Using a stepwise multivariate logistic regression, the exercise mitral inflow duration and the degree of deformation in the LV lateral wall during exercise were the two best independent predictors of response.

Conclusion.— Prediction of response to CRT has to be based on a multivariable analysis including RV function, LA size, but also dysynchrony and regional LV function.

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35 Prognostic signification of left atrial spontaneous contrast in patients with non valvular atrial fibrillation and a CHADS2 score = 0

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Background.— Transesophageal echocardiography (TEE) can detect left atrial (LA) thrombus and LA spontaneous echocardiographic contrast (SEC), which have been associated with a higher risk of thromboembolism in patients with atrial fibrillation (AF). We hypothesized that TEE-detected LASEC could predict cardiovascular events in AF in addition to clinical risk stratification in CHADS2 score = 0 patients.

Methods.— Among 763 consecutive patients hospitalized for non valvular AF (NVAF), prior to cardioversion, TEE was systematically performed within 24h after admission; 205 patients had a CHADS2 score = 0. All patients were followed-up (mean 6.3 ± 4.3 years) and cardiovascular (CV) events (stroke, death, or heart failure) defining a composite endpoint were recorded.

Results.— Mean age was 54.5 ± 13.5 years. NVAF was paroxysmal in 101 patients (49.3%), persistent in 82 (40.0%) and permanent in 22 (10.7%). LA thrombus was found in one patient (0.5%), LASEC in 60 (29.3%), classified as mild in 43 (21.0%), moderate in 14 (6.8%) and severe in three (1.5%). One hundred seventy six (87.1%) were prescribed warfarin and 25 (12.4%) aspirin at hospital discharge. At follow-up, death occurred in 27 patients (13.2%), stroke in five (2.4%), heart failure in four (2.0%). AF recurrence was observed in 60 patients (29.3%) and haemorrhage requiring hospitalization in five (2.4%). The Kaplan-Meier (figure) curves showed that the presence of LASEC (Yes/No) was associated with a higher risk of CV events.

Conclusions.— TEE-detected LASEC is associated with a higher risk of CV events (stroke, death, or heart failure) at long-term follow-up in NVAF at very low risk of thromboembolism.

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Session no 6 — Valve diseases and endocarditis

36 Is echocardiographic follow-up of importance in patients presenting with carcinoid tumor and carcinoid syndrome?

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Background.— Carcinoid heart disease may occur in patients presenting with carcinoid tumor and carcinoid syndrome. Studies evaluating the echocardiographic follow-up of this specific population remain rare. The aim of this prospective study was to assess the natural history of cardiac involvement in patients presenting with carcinoid tumor and carcinoid syndrome.

Methods.— We studied 100 consecutive patients (48 men, 52 women) presenting with carcinoid tumor and carcinoid syndrome. All patients underwent annual transthoracic echocardiographic studies and biological carcinoid markers.

Results.— Mean age of our population was 56 ± 12 years (range 36 to 83). At baseline, prevalence of carcinoid heart disease was 31%, whereas at the end of follow-up (mean FU: 42 months), this prevalence was 52% (P = 0.003). Correlations were strong between urinary 5-HIAA and severity score (r = 0.90, P < 0.0001). A carcinoid heart disease was systematically found in all patients presenting with at least three years of carcinoid syndrome and increased level of urinary 5-HIAA. In patients without carcinoid heart disease, no occurrence of carcinoid heart disease was found after three years of conventional therapeutic strategy.

Conclusion.— Prevalence of carcinoid heart disease increases during follow-up. Carcinoid heart disease may progress over time, leading to perform annual echocardiographic follow-up.

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37 LAA closure monitoring by transesophageal echocardiography using ice probe


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**Background.**— Intracardiac echocardiography probe can be used trough esophageal route (ICE-TEE) to monitor transapical puncture and evaluate left atrial appendage (LAA) without requiring general sedation. The purpose of the study is to evaluate the accuracy and the safety of ICE-TEE during Amplatzer Cardiac Plug (ACP) implantation.

**Methods.**— The study included 16 consecutive patients (75 ± 7 years) in atrial fibrillation with high-risk of embolism (CHA/D-Vasc = 5 ± 1.4) that required LAA closure by ACP because of severe bleeding complications occurring under vitamin K antagonist (HAS-BLED = 4 ± 0.9). Standard TEE was performed the day before the device implantation for LAA sizing and excluding thrombosis. During the procedure, ICE-TEE was used under local anesthesis to determine ACP diameter (ACP diameter = 1.2*LAA diameter by ICE-TEE) and monitor ACP positioning. LAA size by ICE-TEE was compared to the size obtained by fluoroscopy and standard TEE and ACP lobe size after device implantation by ICE-TEE to cardiac computed tomography (CT).

**Results.**— LAA maximal diameter by ICE-TEE did not differ from TEE (21 ± 3 mm vs. 20 ± 3 mm, r = 0.9, P < 0.001), while fluoroscopy measurement was lower (19 ± 3 mm, P < 0.05 vs. ICE-TEE and P = 0.08 vs. TEE). ACP was successfully implanted in 13 patients after one device, two patients after two devices and one failed because of a complex LAA anatomy. As expected ACP diameter implanted was 1.2 ± 0.04 (mean = 25 ± 3 mm, ≥ 26 mm in 10/16 patients) greater than LAA size measured by ICE-TEE. ACP size by ICE-TEE at the end of the procedure was similar to cardiac CT measurement (23 ± 7 mm vs. 23 ± 4 mm, R = 0.98, P < 0.001). Finally, the procedure (mean duration = 62 ± 27 minutes, X-ray exposure = 78 ± 51 Gray/m²) was safely conducted in all without pericardial effusion and prosthesis migration.

**Conclusions.**— ICE-TEE probe through esophageal route may be used for the sizing and the monitoring of ACP device implantation. Compared to standard TEE, ICE-TEE does not required general sedation.

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**38 Echocardiographic prediction of risk of embolism in patients with active infective endocarditis**

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**Objectives.**— The aim of our study was to assess the value of transesophageal echocardiography (TEE) in predicting embolic events (EEs) in a large group of patients with definite endocarditis according to the Duke criteria, including silent embolism.

**Background.**— Infective endocarditis is a serious disease with diverse clinical manifestations. The value of echocardiography in predicting embolism in patients with endocarditis remains controversial. Rare studies reported an increased risk of embolism in patients with large and mobile vegetations.

**Methods.**— Transesophageal echocardiograms of 212 consecutive patients with definite infective endocarditis (IE) were analyzed. The incidence of embolism was compared with the echocardiographic characteristics (localization, size and mobility) of the vegetations. To detect silent embolism, cerebral scans and abdominal echography were performed in 87% of patients.

**Results.**— Among 212 patients, 32 (15%) had one or more EEs. There was no difference between patients with and without embolism in terms of age, gender and valve involved. On univariate analysis, Staphylococcus infection and vegetation length and mobility were significantly related to EEs. A significant higher incidence of embolism was present in patients with vegetation length > 10 mm (78.1%, P < 0.001) and in patients with mobile vegetations (71.8%, P < 0.001). Embolism was particularly frequent among 30 patients with both severely mobile and large vegetations (>15 mm) (93.75%, P < 0.001). On multivariate analysis, the only predictors of embolism were vegetation length (P = 0.03) and mobility (P = 0.01).

**Conclusions.**— Our study shows that the presence of vegetations on TEE is predictive of embolism and that the morphologic characteristics of vegetations are helpful in predicting EEs in both mitral and aortic valve IE. It also suggests that early operation may be recommended in patients with vegetations > 15 mm and high mobility, irrespective of the degree of valve destruction, heart failure and response to antibiotic therapy.

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**39 Contribution of the simplified proximal isovelocity surface area method in the evaluation of mitral stenosis**

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**Introduction.**— Echocardiographic measurement of mitral valve area (MVA) in the mitral stenosis (MS) is done by several methods including the proximal isovelocity surface area (PISA). One limitation for this method is the requirement of an angle correction factor (angle alpha between the mitral leaflets), which requires a manual calculation.

**Objectives.**— The aim of our study is to verify the validity of a simplified formula (simplified PISA) based on a fixed value of angle alpha compared by in a group of patients with rheumatic MS the reliability of the simplified PISA method versus the two-dimensional planimetry, taken as a reference examination, to determine the effect of the presence of atrial fibrillation (AF), a mitral regurgitation (MR) ≥ 2, an aortic insufficiency (AI) ≥ 2, the valvular redesign and the degree of MS on the accuracy of the simplified PISA method. Also we checked the correlation between PISA and simplified PISA.

**Patients and methods.**— This is a prospective study of 110 patients (78 females and 32 males) having rheumatic MS with a mean age of 47 years [22; 89]. Sixty-five of them (59%) were in sinus rhythm, 25 patients (23%) had an MR ≥ 2, four patients (1.8%) had an AI ≥ 2, seventy patients (63.6%) had a Wilkins score ≥ 8 and 35 patients (32%) had non severe MS (SM > 1.5 cm²). The MVA was measured by planimetry then by PISA in all patients. The simplified PISA was calculated based on an angle alpha = 100° in all our patients.

**Results.**— There is no statistically significant difference (P ≥ 0.001) between the mean mitral valve areas measured by simplified PISA (1.30 ± 0.38 cm²) and those measured by planimetry (1.37 cm² ± 0.34). The correlation between planimetry and simplified PISA is excellent (r = 0.93) even in the presence of AF (r = 0.884, P < 0.001), MR ≥ 2 (r = 0.833; P < 0.001) and a Wilkins score ≥ 8 (r = 0.86; P < 0.01). Our results are not statistically interpretable for AI ≥ 2 because of the reduced number of patients. The correlation between the simplified PISA and planimetry is rather bad in the case of non-severe MS (r = 0.22). We found a good correlation between the MVA measured by simplified PISA compared to the PISA with corrected angle (r = 0.86; P = 0.04).

**Conclusion.**— The simplified PISA provides a reliable measurement of the MVA during the MS whatever the anatomic and clinical conditions of MS. This simplification would facilitate and extend the use of the PISA as an additional method for the assessment of MVA in routine practice.

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**40 Mitral valve replacement for functional mitral regurgitation in severe heart failure patients**